

This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

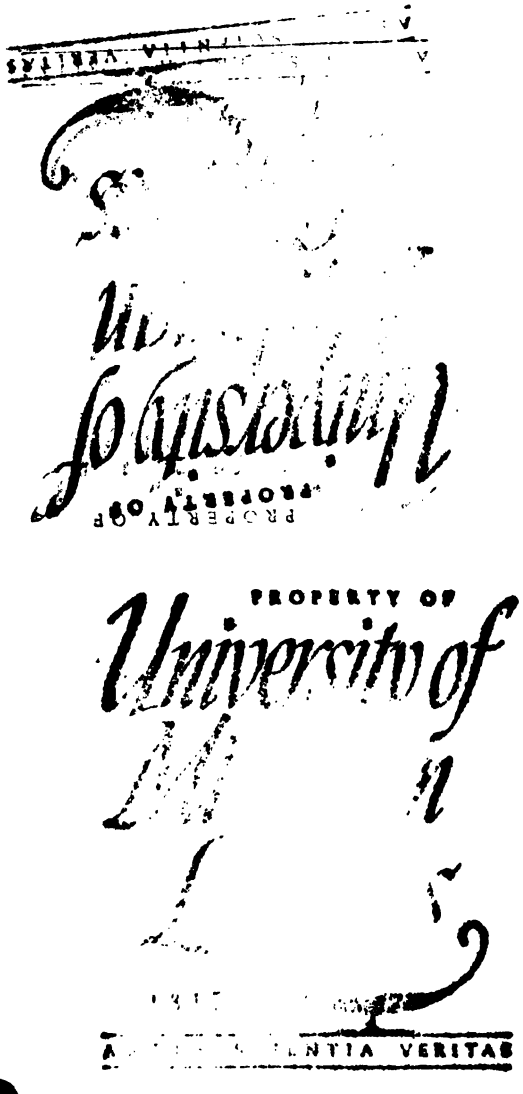
About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

BUHR A

a39015 01802118 1b

PROPERTY OF
University of


PROPERTY OF
University of
SCIENTIA VERITAS

THE

ALGA–FLORA

OF

YORKSHIRE.

BOTANICAL TRANSACTIONS OF
THE YORKSHIRE NATURALISTS' UNION.
VOL. 5.

THE

ALGA-FLORA OF YORKSHIRE:

A COMPLETE ACCOUNT OF THE KNOWN
FRESHWATER ALGÆ OF THE COUNTY,

WITH MANY NOTES ON
THEIR AFFINITIES AND DISTRIBUTION.

BY

W. WEST, F.L.S.,

President of the Yorkshire Naturalists' Union, 1899;

AND

G. S. WEST, B.A., A.R.C.S.,

Hutchinson Research Student, and formerly Scholar of St. John's College, Cambridge;
Professor of Natural History at the Royal Agricultural College,
Cirencester.

LEEDS:
PUBLISHED FOR THE YORKSHIRE NATURALISTS' UNION
BY TAYLOR BROS., PRINTERS, SOVEREIGN STREET.

1901.

BIBLIOGRAPHY OF THIS VOLUME.

—:—

First Instalment : Sheets A, B, C, pages 5-52, forming Part 22 of the Transactions of the Yorkshire Naturalists' Union, published September, 1900.

Second Instalment : Sheets D, E, F, pages 53-100, forming Part 23, published December, 1900.

Third Instalment : Sheets G, H, I, J, pages 101-164, forming Part 25, published July, 1901.

Fourth Instalment : Sheets K, L, M, N, O, P, pages 165-239, including Title-Page and Index, forming Part 27, published July, 1901.

3/3/34
Botany
8-13-65

Science Library
QK
373
.W522.
132
2789
882

THE

ALGA-FLORA OF YORKSHIRE.

Yorkshire, being much the largest county in England, is in consequence of its diversified topographical characters fairly rich in freshwater algæ, although as compared with either Westmorland or Cumberland it lacks many of the more uncommon species. This is due to the different character of the geological formations, which consist of carboniferous, oolitic, and other limestones, shales, grits, and alluvial deposits. The mountainous portion of the county is not so productive as such a region would be were its strata composed of the older Palæozoic rocks, or if it possessed some rocks of an eruptive, igneous origin. In the extreme north-west a trap-dyke does occur in a very limited area, and this appears to have considerably augmented the richness of that district. In addition to the Silurian rocks near Sedbergh, there are a few other such small inliers of this formation, but they do not appear to have much influence on the general alga-flora. The mountainous region, known as the north-western fells, is a district of lofty hills, thirty-six of which attain an altitude of 2,000 feet or more, the highest point being Mickle Fell (2,596 feet). There are many sub-alpine algæ found in this extensive district, and many rare ones, but only a few of the upland bogs are productive of the rarer species, most of which are obtained from small springs high up on the mountains and from the dripping rocks of the ghylls and glens. In this district the three largest natural sheets of water are Malham Tarn (altitude 1,250 feet) Semer Water, and Birkdale Tarn, the first-mentioned being much the most productive.

It is impossible to find a permanently moist situation in which algæ are absent. They are found on damp earth, rocks, walls, palings, shaded tree-trunks, in spouts, rain-tubs, etc.; they are met with again in all kinds of running water, from the tumbling cataract and rapid torrent to the slow, majestic river; but it is in perfectly quiet waters that they are most prolific, whether it be in the tiny moor-pool or the expansive lake. Some even find shelter in symbiotic relationship with other plants; for instance, a species of *Anabæna* lives with the aquatic Lycopod *Azolla*, and another lives with the Hepatic *Blasia*, to say nothing of those associated with fungi to form the compound dual organism known as a lichen, or those symbiotically connected with such animals as *Hydra viridis* and certain species of *Amœba*.

Many of the larger freshwater algæ are noticeable as green, slimy masses floating on the surface of or attached to the sides of ponds, ditches, rivers, etc. Small tufts of these are best collected in tubes or small bottles. Constantly dripping rocks yield quite characteristic species, and even shady, moist rocks have an alga-flora of their own. On vertical, moist rocks (especially limestone) it is not uncommon to find coriaceous patches, or gelatinous masses, of a red, brown, green, bluish-green or blackish colour, and an examination of such masses is always interesting.

There are a vast number of beautiful algæ which are very minute, and the places in which they abound are not usually obvious to the casual observer. They generally occur about the stems and leaves of submerged plants, such as *Utricularia minor*, *Myriophyllum*, *Nymphæa*, *Nuphar*, *Potamogeton*, *Scirpus fluitans*, *Isoëtes*, etc. Many of the Muscineæ, such as *Sphagnum contortum*, *S. plumosum*, *Amblystegium scorpioides*, *A. falcatum*, *A. exannulatum*, *A. glaucum*, *Fontinalis antipyretica*, *Jungermannia inflata*, *Nardia emarginata*, etc., are often richly clothed with small species. The best way to collect from plants of this kind is to remove them (or portions of them) from the water with

as little mud as possible, and allow the water to drain away for about a minute or more; they should then be gently squeezed over a wide-mouthed bottle, allowing the issuing water to collect in the bottle. For several reasons the bottles should not be filled quite full. We have known about a thimbleful of such a slimy squeezing to yield more than a hundred (or even three hundred) species and many thousands of individuals. This is exceptional, however, and as a contrast a similar squeezing from another locality might yield hardly more than one or two species, and these of the commonest.

If possible, algæ should always be examined when freshly gathered, as many of them are more easily determined in the living state. It may be as well to note, however, that a large number of the Desmidieæ, especially those with characteristic surface markings, can only be determined with precision from dead, empty cells, or semi-cells.

Algæ of all kinds are best preserved by adding to the water in which they are living an equal volume of a weak solution (about 2%) of potassium acetate (to which has been added a minute quantity of cupric acetate). They may also be preserved by adding a few crystals of carbolic acid to the fluid containing them (about six or eight grains of crystallized carbolic acid to each ounce of liquid), but the outlines of the cells have not the clearness shown by those preserved in potassium acetate. Most algæ are much better for examination when preserved in a fluid medium than when dried. On drying they usually collapse, and on being soaked out they very often do not reattain their original form. Most of the Myxophyceæ, however, can be preserved very well by drying, and at the same time they retain their bright colours, this being a distinct advantage over those preserved in fluid.

Most of the mountain tarns are but poor collecting places, the best being Oughtershaw Tarn (Mid-West Yorks.) and Hunter's Hole, Craydale Moor (North-West Yorks.), both of which are in the midst of deep peat at an elevation of about

2,000 feet. The best results were obtained, however, from small, permanent, peaty pools containing *Sphagnum plumosum* and *S. contortum*, and from some of those rocks over which the water incessantly trickles. It might not be amiss here to emphasize the importance of these gatherings from vertical wet rocks, as many of the rarest Desmids and the best Myxophyceæ are to be obtained from the gelatinous material of various colours coating the surfaces of rocks constantly kept moist by a thin film of water. The moorlands stretching in a westerly direction from Ilkley and Keighley are not so rich as the more northern districts, and present a sameness and specific uniformity which is markedly absent from the latter.

The most productive grounds for Desmids are those of the Central Plain, the commons at Pilmoor, Strensall and Riccall being parts of the primæval boggy country, and both in their topography and alga-flora are very similar to the commons of south-west Surrey. Unfortunately, Strensall Common has now been drained for military purposes, and nearly all its former treasures have gone. Pilmoor, near Thirsk, is probably the richest locality in Yorkshire for Desmids, above 130 species having been found there, among which were many very rare ones. Cocket Moss, near Giggleswick, is also a very rich locality for this family of Conjugatæ, and a boggy place about two miles south of Clapham, on the way to Bowland Knotts, was also productive of many uncommon Desmids. The best gatherings from both Pilmoor and Cocket Moss were obtained from *Utricularia minor*. The bogs and springs of Upper Teesdale were found to be exceptionally rich in many of the uncommon species.

The largest natural sheet of water in the county is Hornsea Mere, but it is comparatively poor in algæ, being similar in that respect to the rest of the low-lying land in the East Riding.

The list of algæ published in Lees' 'Flora of West Yorkshire' (1888) was very hurriedly put together; it was followed by several other papers and notes referring to the algæ of Yorkshire,

the most important of which are:—Additions to the Algæ of West Yorkshire, Nat., March and April, 1889; Algæ from Birkdale Tarn, Nat., Aug., 1889; Freshwater Algæ of North Yorkshire, J. of Bot., vol. 27, 1889; Additions to the Freshwater Algæ of West Yorkshire, Nat., Aug., 1891; Notes on the Freshwater Algæ of the East Riding of Yorkshire, Nat., July, 1893. There are also three papers of importance by W. B. Turner; these were published prior to the 'Flora of West Yorkshire,' and are:—The Algæ of Strensall Common, Nat., Dec., 1883; Notes on Freshwater Algæ with descriptions of new species, Nat., Feb., 1886; Notes on Algæ collected at Gormire and Thirkleby, Nat., Sept., 1887. In addition to the above there is a paper which was published by George Norman in 1860, entitled 'List of Diatomaceæ occurring in the neighbourhood of Hull,' Trans. Micr. Soc., vol. 8. Since the appearance of the above papers a large amount of material has been collected and examined from many parts of the county, with the result that the number of species has been greatly increased, and a large number of additional localities have been found for species already recorded.

The authorities in brackets after some of the localities refer to the persons who have recorded the species from those localities, and if the mark ! follows the locality we have also seen a specimen from that locality. In all other cases the records are entirely our own.

We here express our indebtedness to all who have at any time collected material for us, our thanks being especially due to Mr. Ll. J. Cocks for some most excellent gatherings from Pilmoor, as well as various material from Harrogate, Knaresborough, near Jervaulx Abbey and other places. Mr. J. Beanland collected for us in certain parts of the East Riding, Mr. I. H. Burkill in the Scarborough district, Mr. W. Denison Roebuck in Upper Swaledale, from Birkdale Tarn, etc., the Rev. W. Fowler about Liversedge, etc., and Mr. J. J. Marshall about Market Weighton. Mr. M. H. Stiles sent us some slides of

diatoms from near Doncaster, and followed up this action by very kindly placing at our disposal a full and valuable list of the diatoms of that district. In his list were enumerated about 125 species and many varieties, about a dozen of each of which were additions to the flora. Of those localities vouched for by Mr. Stiles 'Askern district' includes Askern, Wrancar Drain, and Thorpe brickpond; 'Cusworth district' includes Cusworth, Scawthorp and Bentley; and 'Hatfield district' includes Hatfield West Moor, Hatfield brickponds, and Sandall brickpond; 'Doncaster Town Water' is from Firsby, Thrybergh, and Sheffield.

Though we have made hundreds of journeys in quest of algæ, we have not personally visited every district in Yorkshire, yet we trust that the result of our efforts will form a substantial basis-list, serving as a useful guide to future workers both in the matter of the classification of these plants and in the species they may expect to find. The classification adopted is the one we think the most accurate and reliable, and great pains have been taken to ensure that the nomenclature is as accurate as possible. In a paper of this kind it is essential that some synonyms should be given, as they are so useful to other workers, especially when, as in many cases, they are the names under which the plants have been at one time recorded for the county; moreover, they are often the names (erroneous ones) found in English text books. For these reasons as many synonyms have been introduced as were considered to be necessary for the use of those who are not well versed in the more recent phycological literature.

There will no doubt appear to be a dearth of localities for many Œdogoniaceæ and Zygnemaceæ, which are in reality widely distributed. This is largely due to the fact that only those species have been recorded that were in a satisfactory condition for accurate identification, that is to say, those which possessed ripe spores (oospores or zygospores).

All measurements are given in mm. or thousandths of a mm. (μ). 1 μ=·001 mm.

Of the complete alga-flora at least 55 species have not previously been recorded for the British Isles; special mention is made of this under the species. Mention is also made of those varieties and forms which are similarly new records to Britain.

The following call for particular notice:—

Hormiscia zonata (Webb & Mohr.) Aresch. var. *bicolor* (Eng. Bot.) Nob.

Debarya calospora (Palla) Nob.

Penium curtum Bréb. var. *obtusum* West & G. S. West.

Closterium parvulum Näg. var. *angustum* West & G. S. West.

Closterium sigmoideum Lagerh. & Nordst. forma *major.*

Closterium acutum (Lyngb.) Ralfs var. *linea* (Perty) Nob.

Xanthidium variabile West & G. S. West.

Cosmarium subprotumidum Nordst. var. *Gregorii* (Roy & Biss.) Nob.

Cosmarium Pokornyanum (Grun.) Nob.

Cosmarium cymatopleurum Nordst. var. *Archerii* (Roy & Biss.) Nob.

Cosmarium tetragonum (Näg.) Arch. var. *Davidsonii* (Roy and Biss.) Nob.

Cosmarium Willei Nob. var. *ordinatum* West & G. S. West.

Cosmarium pericymatium Nordst. var. *eboracense* West & G. S. West.

Staurastrum gladiosum Turn. var. *delicatulum* West & G. S. West.

Staurastrum pileolatum Bréb. var. *Brasiliense* (Börg.) Lütkem.

Rhaphidium setigerum (Schröder) Nob.

Class **FLORIDEÆ.**

Family *BATRACHOSPERMEÆ.*

Genus BATRACHOSPERMUM Roth., 1797.

1. **Batrachospermum moniliforme** Roth.

Mid W.—Stream near Towton. Washburn Valley. Blubberhouses (E. Howgate). Malham (H. F. Parsons). Penyghent. Leeds district (W. B. Turner). Meanwood (J. Abbott). Baildon. Sherburn Town Drain (F. A. Lees). Malham Tarn (C. B. Crawshaw and C. P. Hobkirk). Markington! (Rev. J. S. Tute).

S.W.—Battye-ford near Mirfield (H. F. Parsons). Upper Bradfield (Rev. A. Gatty). Swinefleet Warping-Drain (H. F. Parsons). Skelmanthorpe. Allerton.

Var. **stagnale** Ag.

Mid W.—Malham Cove (C. B. Crawshaw and C. P. Hobkirk).

2. **Batrachospermum vagum** (Roth.) Ag.

Mid W.—Kirkstall (W. B. Turner). Near Giggleswick.

S.W.—Bingley.

N.E.—Strensall (var.; W. B. Turner). Castle Howard. Scarborough Mere.

Var. **keratophytum** (Bory) Sir.

Mid W.—In stream, Horton-in-Ribblesdale.

3. **Batrachospermum atrum** (Dillw.), Harv.

Mid W.—Barkston (H. F. Parsons). Meanwood! (J. Stubbins).

Genus CHANTRANSIA Fries, 1825.

4. **Chantransia chalybea** (Lyngb.) Fries.

S.W.—Near Halifax. Hainworth (T. Hebden). Marley, near Bingley.

Mid W.—Baildon.

5. **Chantransia violacea** Kütz.

S.W.—On dripping stones amongst *Rhynchostegium rusciforme*, Horton Park, Bradford.

Mid W.—Eldwick. Ingleborough.

6. **Chantransia pygmæa** Kütz.

MID W.—Bolton Woods. Ingleton. Douk Ghyll on the western slope, and Heseltine Ghyll on the eastern slope of Penyghent. Whernside.

7. **Chantransia Hermannii** (Roth.), Kütz.

S.W.—North Dean.

MID W.—Shipley Glen.

FAMILY *HILDENBRANDTIACEÆ.*

GENUS HILDENBRANDTIA Nardo, 1845.

8. **Hildenbrandtia rivularis** (Liebm.), J. Ag.

[Syn. *H. rosea* Kutz. var. *fluviatilis* Kutz.]

S.W.—Forming dark-red patches on rocks and stones in streams and dripping-places, not frequent. Anston Crags (Rev. Hild. Friend).

MID W.—In rill near Rawdon! (H. T. Soppitt). Shipley Glen. Gordale.

FAMILY *LEMANEACEÆ.*

GENUS LEMANEA Bory, 1808.

9. **Lemanea fluviatilis** Ag.

On rocks, stones, and wood in streams and torrents; also in mill-sluices. Generally where the force of the water is greatest.

MID W.—General, but scarce. Shipley Glen. Kildwick. In the river Crimple, Spofforth! (F. A. Lees). River Wharfe, Boston Spa and Wetherby! (F. A. Lees). Leathley. Near Harrogate! (T. Hick; I.l. J. Cocks). Ripon (W. Brunton). Near Gigglesw̆ick. Ingleborough.

S.W.—Upper Bradfield, near Sheffield (Rev. R. A. Gatty).

N.W.—Cautley Spout.

10. **Lemanea torulosa** (Roth.), Ag.

MID W.—On vertical face of rocks of waterfall, Malham (iii. 1894).

CLASS **FUCOIDEÆ.**

FAMILY *HYDRURACEÆ.*

GENUS HYDRURUS Ag., 1824.

11. **Hydrurus penicillatus** Ag.

S.W.—Newsholme Dean, near Keighley (T. Hebden).

MID W.—Esholt.

Class **CHLOROPHYCEÆ.**

Order CONFERVOIDEÆ HETEROGAMÆ.

Family *COLEOCHÆTACEÆ.*

Genus COLEOCHÆTE Bréb., 1844.

12. **Coleochæte scutata** Bréb., 1844.

S.W.—Doncaster. Frequent about Bradford (on *Elodea*, etc.). Shipley.

Mid W.—Adel Bog (J. Abbott).

N.E.—Strensall (W. B. Turner). Malton. Scarborough Mere.

S.E.—Skipwith Common. Market Weighton.

13. **Coleochæte orbicularis** Pringsh.

S.W.—Frizinghall Dam, on *Elodea canadensis*, reaching a diameter of 3 mm.; (abundant, iii. 1895).

N.E.—Pilmoor, near Thirsk.

14. **Coleochæte soluta** Pringsh.

N.E.—Pilmoor, near Thirsk.

Species of this genus are, as a rule, epiphytic on aquatic phanerogams: they are no doubt generally distributed, but are very easily overlooked.

Genus APHANOCHÆTE Berth., 1878.

15. **Aphanochæte repens** Berth.

Mid W.—Baildon Moor, on *Cladophora crispata* and *Œdogonium macrandrum*. Markington! (Rev. J. S. Tute). Malham Tarn Bog.

N.E.—Malton. Saltburn.

16. **Aphanochæte pilosissima** Schmidle.

Mid W.—Staveley Dam, near Knaresborough.

N.W.—Lund's Fell, attached to *Mougeotia* sp. and to *Zygnema pectinatum*.

17. **Aphanochæte polytricha** Nordst.

N.W.—Mossdale Moor, Widdale Fell; a small form, diam. cell. 14 μ. Previously unrecorded for the British Isles.

FAMILY *ŒDOGONIACEÆ.*

GENUS BULBOCHÆTE Ag., 1817.

18. **Bulbochæte intermedia** De Bary.

N.E.—Pilmoor, near Thirsk.

19. **Bulbochæte setigera** (Roth)., Ag.

S.W.—Cullingworth.

MID W.—Adel Bog (J. Abbott). Yeadon Dam. Rombald's Moor.

N.E.—Strensall ! (W. B. Turner).

20. **Bulbochæte rectangularis** Wittr.

N.E.—Strensall ! (W. B. Turner).

GENUS ŒDOGONIUM Link., 1820.

21. **Œdogonium cryptoporum** Wittr. var. **vulgare** Wittr.

S.W.—Bradford district.

MID W.—Markington ! (Rev. J. S. Tute).

22. **Œdogonium vernale** (Hass.), Wittr.

N.W.—Masham.

23. **Œdogonium nodulosum** Wittr.

S.E.—Skipwith Common.

Not recorded previously from the British Isles.

24. **Œdogonium Vaucherii** (Le Cl.), A. Br.

N.W.—Cronkley Fell.

25. **Œdogonium Itzigsohnii** De Bary.

MID W.—Ingleborough. Cray Moss.

N.E.—Strensall Common.

26. **Œdogonium platygynum** Wittr.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

27. **Œdogonium Rothii** (Le Cl.), Pringsh.

S.W.—Near Bradford.

28. **Œdogonium undulatum** (Bréb.), A. Br.

N.E.—Strensall Common. Pilmoor, near Thirsk; in very fine fruit (vii. 1897).

29. **Œdogonium cyathigerum** Wittr.

S.W.—Rawcliffe Common. Only previously known in this country from Harefield, Middlesex.

30. **Œdogonium flavescens** (Hass.), Wittr.

S.W.—Bradford district.

31. **Œdogonium Braunii** Kütz.

MID W.—Adel Bog (J. Abbott). Baildon.

32. **Œdogonium macrandrum** Wittr.

MID W.—Baildon Moor.

33. **Œdogonium acrosporum** DeBary.

N.E.—Pilmoor, near Thirsk.

34. **Œdogonium ciliatum** (Hass.), Pringsh.

MID W.—Bramhope (W. B. Turner).

35. **Œdogonium calcareum** Cleve.

N.W.—Cronkley Fell.

36. **Œdogonium Pringsheimii** Cram. var. **Nordstedtii** Wittr.

S.W.—Frizinghall, in ponds with *Œdogonium Boscii.*

This variety has not before been recorded from the British Isles.

37. **Œdogonium punctato-striatum** DeBary.

N.E.—Strensall Common. Pilmoor near Thirsk. In fine fruit, vii., 97.

38. **Œdogonium Boscii** (Le Cl.), Wittr.

S.W.—Frizinghall, in ponds.

N.E.—Pilmoor, near Thirsk.

39. **Œdogonium tumidulum** Kütz.

MID W.—Bramhope and Adel (J. Abbott).

40. **Œdogonium rivulare** (Le Cl.), A. Br.

S.W.—Dewsbury district (C. B. Crawshaw and C. P. Hobkirk).

MID W.—Baildon.

41. **Œdogonium giganteum** Kütz.

S.W.—Near Mirfield; this was recorded in Lees' 'Flora of West Yorkshire' as *Œdogonium Landsboroughii* (Hass.), Wittr. The

determination was kindly made for us by Karl E. Hirn, of Helsingfors, Finland. It has not previously been recorded from the British Isles.

42. **Œdogonium princeps** (Hass.), Wittr.

N.W.—Near Sedbergh.

43. **Œdogonium vesicatum** (Lyngb.), Wittr.

MID W.—Bramhope (J. Abbott).

N.E.—Strensall (W. B. Turner).

44. **Œdogonium Ahlstrandii** Wittr.

N.E.—Pilmoor, near Thirsk.

This species has not previously been recorded from the British Isles.

45. **Œdogonium subsetaceum** Kütz.

N.W.—Near Sedbergh.

46. **Œdogonium delicatulum** Kütz.

S.W.—Askern.

N.E.—Strensall (W. B. Turner).

47. **Œdogonium tapeinosporum** Wittr.

N.E.—Pilmoor, near Thirsk.

Not previously recorded from the British Isles.

FAMILY *CYLINDROCAPSACEÆ.*

GENUS CYLINDROCAPSA Reinsch, 1867.

48. **Cylindrocapsa geminella** Wolle var. **minor** Hansg.

N.E.—Carlton Bank.

Only known elsewhere in the British Isles from Cambridgeshire.

ORDER CONFERVOIDEÆ ISOGAMÆ.

FAMILY *ULVACEÆ.*

GENUS ENTEROMORPHA Link., 1820.

49. **Enteromorpha intestinalis** (L.), Link.

Generally distributed in ditches and drains throughout the county; also more rarely in ponds.

S.W.—Bradfield (Rev. R. A. Gatty). Goole (H. F. Parsons). In the Thorn River or Dyke, Rossington (F. A. Lees). In the

lakes at Horton Park, Bradford. In the canal and in several ponds, Frizinghall. Doncaster.

MID W.—Sherburn (F. A. Lees). Garforth, near Leeds (W. B. Turner).

N.E.—Carlton Bank.

GENUS PRASIOLA Ag., 1821.

50. **Prasiola crispa** (Lightf.), Ag.

S.W.—General. Huddersfield (C. P. Hobkirk). Copley (H. F. Parsons). Allerton. Cullingworth.

MID W.—Wetherby (F. A. Lees). Leeds! (J. Abbott). Rombald's Moor! (H. F. Parsons). Markington! (Rev. J. S. Tute). Shipley.

N.W.—Sedbergh.

N.E.—Scarborough.

GENUS SCHIZOMERIS Kütz., 1843.

51. **Schizomeris Leibleinii** Kütz.

N.W.—On stones subject to the spray of a waterfall in Stone Gill, Dodd Fell (iv. 1898).

Not previously recorded for the British Isles.

FAMILY *ULOTRICHACEÆ*.

SUB-FAMILY ULOTRICHEÆ.

GENUS SCHIZOGONIUM Kütz., 1843.

52. **Schizogonium murale** Kütz.

On damp ground, old walls, old wood, etc.

S.W.—Bradford. Swill Hill.

MID W.—Garforth (J. Abbott).

GENUS HORMIDIUM Kütz., 1843.

53. **Hormidium murale** (Lyngb.), Kütz. [Syn. *Lyngbya muralis* Ag., 1824; *Ulothrix radicans* Kütz., 1849].

S.W.—Coley, near Shelf. Bradford. On shady rocks near Bingley.

MID W.—Leeds. Roundhay (J. Abbott). Otley. Skipton. Gordale (C. B. Crawshaw and C. P. Hobkirk).

54. **Hormidium parietinum** (Vauch.), Kütz.

[Syn. *Ulothrix parietina* Kütz., 1849].

S.W.—Dewsbury (C. B. Crawshaw and C. P. Hobkirk). Halifax. Bradford.

MID W.—Leeds. Skipton.

GENUS HORMISCIA Fries, 1835; em. Aresch., 1866.

55. **Hormiscia subtilis** (Kütz.), De Toni.

[Syn. *Ulothrix subtilis* Kütz.].

S.W.—Ogden Clough.

MID W.—Bowland Knotts. Wigton Moor.

N.W.—Dodd Fell, at 2,000 feet.

Var. **subtilissima** Rabenh., 1868.

[Syn. *Ulothrix subtilissima* Rabenh., 1863].

S.W.—Bradford (ix. 1896).

MID W.—Baildon (iv. 1895), amongst mosses on dripping rocks. Cells 1½—4 times longer than the diameter, with a very pale green, parietal chlorophyll-plate: thickness 4 μ.

Var. **variabilis** (Kütz.), Kirchn.

[Syn. *Ulothrix variabilis* Kütz.].

S.W.—Holmfirth (C. P. Hobkirk). Crimsworth Dean. Ogden Clough. Horton. Heaton. Keighley. Cragg Vale, towards Blackstone Edge.

MID W.—Shipley Glen. Hawksworth. Earl's Seat. Bride Cross, above Farnley Moor. Langcliffe. Simon's Fell. Linn Ghyll. Ribblehead. Malham.

N.W.—Cowgill Wold Moss, Widdale Fell. Bog near Widdale Beck. Cronkley Fell.

N.E.—Carlton Bank. Near Scarborough. Pilmoor, near Thirsk. Malton.

Var. **tenerrima** (Kütz.), Kirchn.

[Syn. *Ulothrix tenerrima* Kütz.].

S.W.—Ogden Clough. Swill Hill. Holmfirth (C. P. Hobkirk). Barnsley. Bradford. Heaton. Keighley Moor.

MID W. - Baildon. Above Eldwick. Bride Cross, above Farnley Moor. Kilnsey. Kirkby Malham (C. B. Crawshaw and C. P. Hobkirk). Ribblehead.

N.W.—Mickle Fell. Hawes. Mossdale Moor, Widdale Fell.

56. **Hormiscia tenuis** (Kütz.) De Toni.
[Syn. *Ulothrix tenuis* Kütz.].

S.W.—Swill Hill. Frizinghall. Marley.

MID W.—Eldwick. Ilkley.

N.W.—River Ure.

N.E.—Malton.

57. **Hormiscia rivularis** (Kütz.) De Toni. [Syn. *Hormidium rivulare* Kütz.; *Ulothrix rivularis* Kütz.].

S.W.—Marley, near Bingley.

58. **Hormiscia æqualis** (Kütz.) Rabenh. var. **catæniformis** (Kütz.) Rabenh.

S.W.—Near Mirfield. Bradford.

MID W.—Malham (C. B. Crawshaw and C. P. Hobkirk). Horton-in-Ribblesdale.

N.W.—Lund's Fell.

59. **Hormiscia moniliformis** (Kütz.) Rabenh.

S.W.—Cullingworth. Holden Ghyll and Worth Valley, near Keighley.

MID W.—Baildon. Cowside Beck, Arncliffe. Ingleborough. Linn Ghyll. Whernside.

N.W.—Mickle Fell. Great Shunnor Fell. Lund's Fell. Widdale Beck. Cautley Spout.

N.E.—Stokesley.

60. **Hormiscia zonata** (Web. et Mohr.) Aresch.

S.W.—Frizinghall. Keighley Moor.

MID W.—Baildon. Eldwick. Gordale (C. B. Crawshaw and C. P. Hobkirk). Malham and Malham Tarn Bog. Penyghent.

N.W.—Mickle Fell. Great Shunnor Fell. Hawes. Cautley Spout and Sedbergh.

S.E.—Near Meaux Abbey.

Var. **bicolor** (Eng. Bot.) Nob. [Syn. *Conferva bicolor* Eng. Bot., 1790—1814; *Hormiscia speciosa* (Carm., 1833) Rabenh., 1868; *H. zonata* var. *valida* (Näg., 1849) Rabenh., 1868].

More or less abundant in mountain streams, more especially in the earlier months of the year.

S.W.—Crimsworth Dean. Holden Ghyll, near Keighley.

MID W.—Leathley. Linn Ghyll. Crook Ghyll near Buckden.

N.W.—Near Sedbergh. Near the 'Moorcock Inn'. Cotterdale. Abundant in the River Ure (iii. 1889).

GENUS RHAPHIDONEMA Lagerh., 1892.

61. **Rhaphidonema nivale** Lagerh.

MID W.—Langcliffe, near Settle (viii., 1896).

Thickness of filaments, 2·5—3·5 μ; total length of filaments, 94—123 μ.

Not previously recorded for the British Isles.

GENUS HORMOSPORA Bréb., 1840.

62. **Hormospora ordinata** West & G. S. West.

MID W.—Cam Fell.

The small size of the cells, their remoteness and comparative shortness sufficiently differentiate this species. The cell-contents are bright green and very granulose.

63. **Hormospora dubia** Schmidle.

S.W.—In horse-trough, Allerton, near Bradford (vi., 1898).

This species has not previously been recorded for the British Isles.

GENUS GLŒOTILA Kütz., 1843.

64. **Glœotila protogenita** Kütz.

N.E.—Pilmoor, near Thirsk.

Previously unrecorded for the British Isles.

GENUS GEMINELLA Turp., 1828.

65. **Geminella interrupta** Turp., 1828; em. Lagerh., 1883.

N.E.—Pilmoor, near Thirsk.

Only known elsewhere in the British Isles from Glen Tilt, Perthshire.

SUB-FAMILY CHÆTOPHOREÆ.

GENUS HERPOSTEIRON Näg., 1849.

66. **Herposteiron repens** (A. Br.) Wittr. [Syn. *Aphanochæte repens* A. Br., 1851, non Berth., 1878].

S.W.—Frizinghall, on *Œdogonium* sp. and *Cladophora flavescens.* Bradford, in aquarium, on *Lemna trisulca* and *Elodea canadensis.*

MID W.—Hawksworth, on *Cladophora.*

N.E.—Pilmoor, near Thirsk. Terrington.

Herposteiron Näg. is distinguished from *Aphanochæte* Berth. by the structure of its bristles; they are articular and strongly remind one of the piliferous apices of the branches of *Chætophora.* Those of *Aphanochæte* are quite simple and possess a sheathing base, which is not septate. In both these genera the chlorophyll masses are parietal. These plants are usually found as epiphytes on larger algæ (*Cladophora, Œdogonium,* etc.) and on *Lemna, Elodea, Nitella,* etc.

GENUS NORDSTEDTIA Borzi, 1892.

67. **Nordstedtia globosa** (Nordst.) Borzi. [Syn. *Herposteiron globosa* Nordst.; *Aphanochæte globosa* Wolle].

MID W.—Cocket Moss, near Giggleswick.

N.E.—Strensall Common.

S.E.—Skipwith Common.

The cells of this plant are spherical and each bears on its dorsal surface a very long seta, which is quite simple. The chromatophores are central and more or less stellate, and the plants are enveloped in mucus.

GENUS CHÆTOSPHERIDIUM Klebahn, 1892.

68. **Chætospheridium minus** Hansg., 1893, [Syn. *Aphanochæte globosa* var. *minor* Hansg.; *Chætospheridium Pringsheimii* Klebahn, 1892].

N.E.—Pilmoor, near Thirsk.

The chromatophores are plate-like and parietal; the cells are not enveloped in mucus.

GENUS CHÆTOPHORA Schrank, 1789.

69. **Chætophora pisiformis** (Roth.) Ag., 1812.

S.W.—Rawcliffe. Askern. Frizinghall.

MID W.—Near Giggleswick. Boston Spa. Near Selby.

N.W.—Ure Head, Lund's Fell.

S.E.—Beverley.

70. **Chætophora tuberculosa** (Roth.) Ag.

S.W.—Keighley (T. Hebden).

MID W.—Baildon. Airton. Buckden. York! (T. Hick). Askham Bog.

N.E.—Strensall (W. B. Turner).

71. **Chætophora elegans** (Roth.) Ag.

S.W.—Dewsbury (C. B. Crawshaw and C. P. Hobkirk).

MID W.—Adel and Roundhay, near Leeds (W. B. Turner). Baildon. Selby (H. F. Parsons).

N.W.—Mickle Fell. Cotterdale.

N.E.—Saltburn. Strensall! (W. B. Turner). Terrington.

72. **Chætophora cornu-damæ** (Roth.) Ag.

[Syn. *Chætophora endivæfolia* Auct.].

S.W.—Saltaire. Bingley.

MID W.—Horton-in-Ribblesdale. Near Buckden.

N.E.—Strensall. Pilmoor, near Thirsk. Scarborough Mere! (G. E. Massee, 1881); very fine (viii. 1890).

GENUS DRAPARNAUDIA Bory, 1808.

73. **Draparnaudia glomerata** (Vauch.) Ag.

MID W.—Markington! (Rev. J. S. Tute). Roundhay, near Leeds (W. B. Turner). Eldwick. Ilkley. Ingleton. Bell Busk.

S.W.—Dewsbury (C. B. Crawshaw). Eccleshill, near Bradford! (W. Nuttall). Bingley. Holden Ghyll, near Keighley.

74. **Draparnaudia plumosa** (Vauch.) Ag.

S.W.—Upper Bradfield (Rev. R. A. Gatty). Clayton.

MID W.—Adel Bog ! (J. Abbott). Wetherby (H. F. Parsons). Leathley. Near Norwood Hall, above Lindley Reservoir.

N.E.—Strensall (W. B. Turner).

S.E.—Beverley.

Var. **pulchella** (Kütz.) Rabenh.

MID W.—In stream, Penyghent.

GENUS STIGEOCLONIUM Kütz., 1843.

75. **Stigeoclonium protensum** (Dillw.) Kütz.

S.W.—Liversedge ! (Rev. W. Fowler). Well, Darton (C. B. Crawshaw and C. P. Hobkirk). Wibsey. Keighley.

MID W.—Farnley (W. B. Turner). Burley ! (W. Nuttall). Ilkley.

N.E.—Pilmoor, near Thirsk.

76. **Stigeoclonium nanum** (Dillw.) Kütz.

S.W.—Near Dewsbury (C. B. Crawshaw and C. P. Hobkirk). Ogden Clough. Coley, near Shelf. Bradford. Heaton.

77. **Stigeoclonium fastigiatum** Kütz.

S.W.—Soothill, Dewsbury (C. B. Crawshaw and C. P. Hobkirk). Near Wakefield. On stones, in stream, Halifax.

MID W.—Still waters of a spring, Moughton Fell.

78. **Stigeoclonium tenue** (Ag.) Rabenh.

S.W.—Liversedge ! (Rev. W. Fowler).

MID W.—Horton-in-Ribblesdale. Ribblehead.

N.W.—Near 'Moorcock Inn.'

N.E.—Scarborough Mere.

79. **Stigeoclonium uniforme** (Ag.) Rabenh.

S.W.—On the surface of a pond, Frizinghall (iv., 95).

Stratum yellow-green, filaments of uniform diameter (7·5 μ), forming intricate, contorted bundles; at places somewhat geniculate. Branches scarce, mostly unilateral, short, much attenuated and with piliferous apices. Cells of main filaments equal to, or twice longer than, the diameter; those of the branches as long as broad. Zoogonidia formed by the division of the cell-contents into four.

Previously unrecorded for the British Isles.

GENUS PROTODERMA Kütz., 1843.

80. **Protoderma viride** Kütz., 1843 [Syn. *Entocladia gracilis* Hansg., 1888; *Endoderma gracilis* De Toni, 1889; *Periplegmatium gracile* Hansg., 1890].

S.W.—Near Bradford, epiphytic on *Elodea canadensis*. Frizinghall, on *Coleochæte orbicularis*.

MID W.—Baildon, on *Callitriche stagnalis* and *Nitella flexilis*. Boston Spa, on *Callitriche*.

N.E.—Pilmoor, near Thirsk. Terrington. Malton.

A small epiphytic, subparenchymatous alga; diameter of cells 3·5—6 μ.

Apparently widely distributed in England.

FAMILY *CONFERVACEÆ*.

GENUS CONFERVA L., 1737; em. Lagerh., 1888.

81. **Conferva bombycina** Ag.

S.W.—Norland Moor and Goole (H. F. Parsons). Liversedge! (Rev. W. Fowler). Bradford. Pontefract (H. F. Parsons). Heaton.

MID W.—Embsay. Adel Bog. Baildon. Eldwick. Boston Spa. Cocket Moss, near Giggleswick. Ingleborough. Horton-in-Ribblesdale. Penyghent. Whernside. Oughtershaw, and Oughtershaw Tarn. Beamsley Beacon.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Hunter's Hole, Craydale Moor (1900 ft.). Mossdale Moor, Widdale Fell. Lund's Fell.

N.E.—Pilmoor, near Thirsk. Malton. Stokesley. Near Scarborough.

S.E.—Waghen. Near Meaux Abbey. Newsholme. Market Weighton.

The most abundant species of the genus and widely distributed.

Forma **minor** Wille.

S.W.—Denholme. Oxenhope.

MID W.—Baildon. Eldwick. Bride Cross, above Farnley Moor. Otley. Penyghent. Near Oughtershaw Tarn. Whernside.

N.E.—Pilmoor, near Thirsk.

S.E.—Beverley. Routh. Near Meaux Abbey. Waghen. Riccall Common. Skipwith Common ! (Rev. W. Fowler).

82. **Conferva ? tenerrima** Kütz.

S.W.—Bradford.

MID W.—Leeds and Adel (J. Abbott). Grassington. Ingleborough. Penyghent. Oughtershaw Tarn.

N.W.—Mickle Fell. Hunter's Hole, Craydale Moor (1900 ft.).

N.E.—Peat deposit, Filey. Pilmoor, near Thirsk.

83. **Conferva affinis** Kütz.

S.W.—Askern.

MID W.—Cam Fell.

N.E.—Pilmoor, near Thirsk.

84. **Conferva raciborskii** Gutw.

S.W.—Abundant in a trough, Shipley. Cullingworth.

N.W.—Cautley Spout.

Thickness of filaments 25—31 μ.

85. **Conferva undulata** West and G. S. West.

S.W.—Ogden Clough. Old Cote Moor.

GENUS MICROSPORA Thur., 1851 ; em. Lagerh., 1888.

86. **Microspora floccosa** (Vauch.) Thur. [Syn. *Conferva floccosa* Ag.].

S.W.—Bradford. Nab Wood, near Bingley. Saltaire. Near Keighley.

MID W.—Adel Bog. Chapel Allerton (J. Abbott). Ilkley. Kilnsey. Penyghent.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Sedbergh.

N.E.—Pilmoor, near Thirsk. Strensall ! (W. B. Turner).

S.E.—Waghen.

87. **Microspora vulgaris** Rabenh.

S.W.—Bradford.

MID W.—Ilkley. Ribblehead.

N.W.—Cronkley Fell. Snaizeholme Fell.

N.E.—Strensall. Scarborough Mere.

S.E.—Market Weighton.

88. **Microspora fugacissima** (Roth.) Rabenh.

S.W.—Bradford. Dewsbury (C. B. Crawshaw and C. P. Hobkirk).

MID W.—Rombald's Moor. Grassington. Leeds. Ingleborough. Bowland Knotts. Adel Bog.

N.W.—Sedbergh. Mickle Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

89. **Microspora pachyderma** (Wille) Lagerh.

MID W.—Cocket Moss, near Giggleswick. Oughtershaw.

S.E.—Skipwith Common! (Rev. W. Fowler).

90. **Microspora wittrockii** (Wille) Lagerh.

MID W.—Stream near Gigglewick and Giggleswick Common.

N.W.—Head of Great Sleddale, 1750 ft. (viii. 1895). Cautley Spout.

N.E.—Pilmoor, near Thirsk.

91. **Microspora abbreviata** (Rabenh.) Lagerh. [Syn. *Conferva abbreviata* Rabenh., 1863; *C. funkii* Kütz., 1849.]

S.W.—Frizinghall.

N.W.—Bog, near Widdale Beck.

92. **Microspora fontinalis** (Berk.) De Toni. [Syn. *Conferva fontinalis* Berk.].

S.W.—Heaton.

MID W.—Blubberhouses (W. B. Turner). Adel Bog. Rombald's Moor.

N.W.—Mickle and Cronkley Fells. Cotterdale.

GENUS OPHIOCYTIUM Näg., 1849.

93. **Ophiocytium arbuscula** (A. Br.) Rabenh. [Syn. *Sciadium arbuscula* A. Br.]

MID W.—Harrogate (J. Abbott).

N.E.—Terrington (vi, 98).

94. **Ophiocytium cochleare** (Eich.) A. Br.

MID W.—Baildon Moor. Eldwick. Wigton Moor. Malham Tarn Bog. Penyghent. Aldfield (Rev. J. S. Tate), recorded as *O. majus* in 'Naturalist,' May, 1850, p. 153.

N.W.—Birkdale Tarn Moss.

N.E.—Terrington. Saltburn. Gormire (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Near Meaux Abbey. Waghen. Routh. Newsholme. Riccal and Skipwith Commons.

Var. **bicuspidatum** Borge.

N.E.—Pilmoor, near Thirsk.

The forms seen agreed with those mentioned by Lemmerman (Forschungsberichte Biol. Stat. Plön, 1896, p. 163, c. fig.) as *f. longispina.* This variety has not previously been recorded for the British Isles.

95. **Ophiocytium majus** Näg.

MID W.—Bramhope (J. Abbott). Eldwick. Staveley Dam, near Knaresborough.

N.E.—Pilmoor, near Thirsk.

96. **Ophiocytium parvulum** (Perty) A. Br.

[Syn. *Brochidium parvulum* Perty].

MID W.—Cocket Moss, near Giggleswick. Malham Tarn Bog. Boston Spa.

FAMILY *CHROOLEPIDACEÆ.*

GENUS TRENTEPOHLIA Mart., 1817.

97. **Trentepohlia aurea** (L.) Mart. [Syn. *Byssus aureus* L., 1753; *Chroolepus aureus* Kütz., 1843].

S.W.—Fairly general away from the towns; most abundant in the limestone districts. Sheffield (S. Anston; A. Carr). Roche Abbey (F. A. Lees). Bingley. Snaith and Conisborough (H. F. Parsons).

MID W.—Ilkley. Bolton Woods. Knaresborough and Sherburn (F. A. Lees). Deighton. Wetherby. Tadcaster. Arncliffe. Giggleswick. Ingleton. Moughton Fell. Upper Ribblesdale (F. A. Lees).

N.W.—Cronkley Fell. Lund's Fell. Hawes. Dent Dale.

N.E.—Staithes! (C. Crossland).

GENUS LEPTOSIRA Borzi, 1883.

98. **Leptosira mediciana** Borzi.

N.E.—Pilmoor, near Thirsk, among *Utricularia minor*. Small forms, thickness of cells 7·5—11·5 μ.

A characteristic and very rare plant, only previously recorded from Italy. This reminds one of a young stage of *Microthamnion kützingianum*, but is less elongate, the cells are somewhat swollen and barrel-shaped, the cell walls are stronger and the cell-contents are of a well-marked yellow-green colour.

GENUS MICROTHAMNION (Näg., 1849) Kirchn., 1878.

99. **Microthamnion strictissimum** Rabenh., 1863. [Syn. *M. vexator* Cooke, 1882].

S.W.—Greetland, near Halifax. Oxenhope. Allerton. Bingley. Keighley Moor.

MID W.—Above Eldwick. Blubberhouses! (W. B. Turner). Bog, two miles south of Clapham.

N.W.—Mickle and Great Shunnor Fells. Masham.

N.E.—Seamer. Scarborough Mere.

We have already shown that *M. vexator* Cooke must be regarded as identical with *M. strictissimum* Rabenh. (cfr. Journ. Roy. Micr. Soc., 1897, p. 475). Schmidle (in Hedwigia, 1899, Bd. xxxviii., p. 169) has placed *M. vexator* as a variety of *M. strictissimum*, but we fail to see any distinction between the plants.

100. **Microthamnion kützingianum** Näg.

Not common, but more abundant than the preceding species, and most abundant in the earlier months of the year. A more diminutive plant than the preceding species and much more branched.

S.W.—Cragg Vale, towards Blackstone Edge. Bradford. Frizinghall. Marley, near Bingley.

MID W.—Above Eldwick. Boston Spa. Cocket Moss near Giggleswick. Horton-in-Ribblesdale. Oughtershaw Tarn. Cam Fell. Whernside. Cowgill Wold Moss, Widdale Fell.

N.W.—Mossdale Moor, Widdale Fell. Snaizeholme Fell. Bog, near Widdale Beck.

N.E.—Strensall Common. Carlton Bank.

FAMILY *CLADOPHORACEÆ.*

GENUS CHÆTOMORPHA Kütz., 1845.

101. **Chætomorpha sutoria** (Berk.) Rabenh.

S.W.—In trough, Heaton, with *Rhizoclonium hieroglyphicum* var. *tortuosum.*

MID W.—Attached to stones, in stream, near Giggleswick.

GENUS RHIZOCLONIUM Kütz., 1843.

102. **Rhizoclonium hieroglyphicum** Kütz., 1843; em. Stockm., 1890.

S.W.—In canal, Frizinghall.

MID W.—Shipley Glen. In stream, Giggleswick.

N.W.—Spring on Dodd Fell, 1,500 feet. Duerley Beck near Hawes.

N.E.—Carlton Bank.

Var. **kochianum** (Kütz.), Stockm. [Syn. *Rhizoclonium kochianum* Kütz., 1845; *R. flavicans* Rabenh., 1868 *non* Jurg., 1824; Cooke, Brit. Freshw. Alg., p. 141, t. 54, f. 8 ?].

N.E.—Cliffs, near Scarborough.

S.E.—Newsholme, near Howden.

Var. **tortuosum** (Kütz.) Stockm.

S.W.—In trough, Heaton, with *Chætomorpha sutoria.*

MID W.—Shipley Glen. Ingleton.

N.W.—Cautley Spout.

GENUS CLADOPHORA Kütz., 1843.

103. **Cladophora crispata** (Roth.), Kütz.

S.W.—Bradfield (Rev. R. A. Gatty). Halifax. Bradford.

MID W.—Shipley Glen. Bolton Woods. Dropping Well, Knaresborough. Oughtershaw Moss. Leeds (W. B. Turner).

N.E.—Near Middleton. Near Scarborough.

104. **Cladophora glomerata** (L.) Kütz.

S.W.—Fairly abundant in most streams, rivers, canals, etc. Upper Bradfield (Rev. R. A. Gatty). Castleford. Coxley Valley, Horbury (C. B. Crawshaw and C. P. Hobkirk). Conisborough (H. F. Parsons). Near Keighley. Wibsey.

MID W.—Moor Allerton, near Leeds (W. B. Turner and J. Abbott). Harrogate. Boston Spa, Wetherby, and Sherburn (F. A. Lees). Shipley Glen! Ilkley and Selby (H. F. Parsons). Kirkby Malham (C. B. Crawshaw and C. P. Hobkirk). Moughton Fell. Attached to stones, Linn Ghyll. Penyghent. Ribblehead. Whernside.

N.W.—Cronkley Fell. Great Shunnor Fell.

N.E.—Strensall. Terrington. Carlton Bank. Scarborough Mere! (G. Massee). Hayburn Wyke.

105. **Cladophora flavescens** Ag.

S.W.—Rawcliffe Common. Frizinghall Dam. Shipley. Doncaster.

MID W.—Hawksworth.

S.E.—Hornsea Mere.

106. **Cladophora ægagropila** (L.) Kütz..

S.E.—'In *Walling Fen* Moor, twelve miles west of Hull, a lake of 100 or 200 acres on a large common, subject to be overflowed by salt water from the Humber. This lake has been drained since these vegetable balls were described in Phil. Trans. xlvii., p. 498.'—Camden's Britannia, translated and enlarged from the edition published by the author in MDCVII., by Richard Gough, London, 1789, iii., p. 98.

ORDER CONJUGATÆ.

FAMILY *ZYGNEMACEÆ.*

SUB-FAMILY MESOCARPEÆ.

GENUS MOUGEOTIA Ag., 1824.

107. **Mougeotia genuflexa** (Dillw.) Ag., 1824. [Syn. *Conferva genuflexa* Dillw., 1809; *Mougeotia mirabilis* A. Br., 1855; *Mesocarpus pleurocarpus* DeBary, 1858].

S.W.—Rawcliffe, near Selby.

MID W.—Askham Bog! (T. Hick). Baildon. Holden Ghyll, near Keighley. Penyghent.

N.W.—Mickle Fell. Near 'Moorcock Inn.'

N.E.—Strensall (W. B. Turner). Seamer.

108. **Mougeotia scalaris** Hass., 1842.

[Syn. *Mesocarpus scalaris* Hass., 1845].

S.W.—Dewsbury (C. B. Crawshaw and C. P. Hobkirk). Ogden Clough. Frizinghall. Marley, near Bingley. Near Keighley.

MID W.—Roundhay (J. Abbott).

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner).

109. **Mougeotia nummuloides** Hass.

[Syn. *Mesocarpus nummuloides* DeBary].

S.W.—Cullingworth. Keighley Moor.

N.W.—Cronkley Fell. Masham. Near the 'Moorcock Inn.'

N.E.—Strensall (W. B. Turner).

110. **Mougeotia parvula** Hass.

[Syn. *Mesocarpus parvulus* (Hass.) DeBary].

S.W.—Newsholme Dean (T. Hebden). Cullingworth.

MID W.—Whernside, at 1,900 feet. Askwith (W. B. Turner). Adel Bog. Wigton Moor. Rombald's Moor. Near Ilkley. Black Hill, near Settle.

N.W.—Mickle and Cronkley Fells. Masham.

N.E.—Scarborough Mere. Strensall! (W. B. Turner).

Var **angusta** (Hass.) Kirchn.

[Syn. *Mesocarpus angustus* Hass.].

MID W.—Adel Bog. Baildon. Above Eldwick. Penyghent.

N.W.—Mickle Fell. Sedbergh.

111. **Mougeotia recurva** (Hass.) De Toni.

[Syn. *Mesocarpus recurvus* Hass.].

MID W.—Baildon.

N.E.—Strensall.

112. **Mougeotia depressa** Hass. Witt.

[Syn. *Mesocarpus depressus* Hass.]

N.W.—Mickle and Cronkley Fells, River Tees.

N.E.—Scarborough Mere.

113. **Mougeotia gracillima** Hass. Witt.

[Syn. *Staurospermum gracillimum* Hass. Delp.]

Mid W.—Rombald's Moor, Burnsmoor [illegible] T. E. Turner. Ingleborough, Pen-y-ghent, Kinsdale [illegible] Wild Moss, Widdale Fell.

N.W.—Mickle and Cronkley Fells, Cumberland.

N.E.—Strensall, Seamer.

114. **Mougeotia viridis** Kütz. Witt.

[Syn. *Staurospermum viride* Kütz.]

S.W.—Near Rotherham, Cullingworth, T. Hebden.

Mid W.—Bog, two miles south of Clapham, Austwick, Horsforth (J. Abbott).

S.E.—Lofthouse Bridge, near Wressle.

115. **Mougeotia quadrangulata** Hass. [Syn. *M. quadrata* Hass. Witt.: *Staurospermum quadratum* (Hass.) De Bary].

N.E.—Strensall, Pilmoor, near Thirsk.

116. **Mougeotia capucina** (Bory) Ag.

N.E.—Pilmoor, near Thirsk, very fine (vi., 98).

Sub-Family Zygnemeæ.

Genus DEBARYA Witt.

117. **Debarya calospora** (Palla) Nob. [Syn. *Mougeotiopsis calospora* Palla in Ber. der Deutsch. Botan. Gesellsch., Jahrg. 12, 1894, heft 8, pp. 228-236, t. xviii.].

N.E.—Pilmoor, near Thirsk.

We showed this interesting plant to be a true species of *Debarya* in Ann. of Bot., March, 1898, vol. 12, p. 49; it certainly possesses pyrenoids, which, as in *D. lævis* (Kütz.) West and G. S. West, are somewhat variable in size and disposition.

The zygospores are less elliptical than those figured by Palla. Thickness, fil. 13 μ; zygospores 18–20 μ × 22–26 μ.

Not previously recorded for the British Isles.

GENUS ZYGNEMA Ag., 1817; em. DeBary, 1858.

118. **Zygnema ordinarium** Berk., 1832. [Syn. *Zygogonium parvulum* Kütz., 1849; *Zygnema parvulum* (Kütz.) Cooke, 1882].

N.W.—Cronkley Fell.

N.E.—Strensall.

119. **Zygnema Ralfsii** (Hass.) De Bary.
[Syn. *Zygogonium Ralfsii* (Hass.) Kütz.].

MID W.—Bramhope and Adel (J. Abbott).

N.E.—Strensall (W. B. Turner).

120. **Zygnema pectinatum** (Vauch.) Ag.

S.W.—Near Heckmondwike (C. B. Crawshaw and C. P. Hobkirk).

N.W.—Great Shunnor Fell. Lund's Fell.

121. **Zygnema cruciatum** (Vauch.) Ag.

S.W.—Wibsey. Cullingworth.

MID W.—Bramhope (J. Abbott). Baildon. Ingleborough.

N.W.—Cronkley Fell. Sedbergh.

122.—**Zygnema stellinum** (Vauch.) Ag.

S.W.—Thornton Moor.

MID W.—Eldwick. Cam Fell.

N.W.—Mickle and Cronkley Fells. Cotterdale.

N.E.—Strensall! (W. B. Turner).

123. **Zygnema Vaucherii** Ag.

N.E.—Pilmoor, near Thirsk.

Var. **stagnale** (Hass.) Kirchn.

MID W.—Baildon.

N.W.—Mickle Fell.

N.E.—Strensall (W. B. Turner).

124. **Zygnema anomalum** (Hass.) Cooke.
[Syn. *Tyndaridea anomala* Hass.].

S.W.—Sharlston (H. F. Parsons).

N.W.—Cronkley and Mickle Fells, frequent.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

125. **Zygnema ericetorum** (Kütz.) Hansg. [Syn. *Zygogonium ericetorum* Kütz.; *Z. ericetorum* var. *α terrestris* Cooke and var. *β aquaticum* Cooke; *Z. Agardhii* Rabenh.; *Z. didymum* Rabenh.].

On damp heaths, etc., more or less abundant, forming dark-green patches, which often incline to violet. Also frequent in peaty ditches on upland moors, the filaments often attaining a length of several feet. The aquatic form (forma *fluitans* (Kütz.) Rabenh.) and the terrestrial form (forma *terrestre* Kirchn.) are practically indistinguishable, the former growing equally well on damp peat, although assuming a darker colour.

S.W.—Goole. Thornton. Harden. Keighley Moor.

Mid W.—Bramhope (J. Abbott). Baildon. Rombald's Moor. Simon Seat. Malham (C. B. Crawshaw and C. P. Hobkirk). Giggleswick Common. Bowland Knotts. Ingleborough. Penyghent. Old Cote Moor. Cray Moss.

N.W.—Mickle, Cronkley, and Great Shunnor Fells. Swaledale, up to 2,200 feet. Mossdale Moor, Widdale Fell. Dodd Fell and Lund's Fell, up to 2,000 feet.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. On damp ground, Whitenab, Scarborough.

126. **Zygnema leiospermum** DeBary.

S.E.—Very fine, from Loftsome Bridge, near Wressle.

127. **Zygnema insigne** (Hass.) Kütz.

Mid W.—Malham (vii. 1891).

Genus SPIROGYRA Link, 1820.

128. **Spirogyra tenuissima** (Hass.) Kütz.

S.W.—Frizinghall. Heaton.

Mid W.—Hawksworth. Baildon. Buckden.

N.W.—River Ure.

N.E.—Strensall (W. B. Turner). Scarborough Mere.

129. **Spirogyra inflata** (Vauch.) Rabenh.

[Syn. *S. tenuissima* forma *inflata* (Vauch.) Cooke].

N.W.—Cronkley Fell.

N.E.—Pilmoor, near Thirsk.

130. **Spirogyra Weberi** Kütz.

S.W.—Hainworth (T. Hebden). Cullingworth. Keighley.

MID W.—Boston Spa.

N.W.—River Ure.

131. **Spirogyra Grevilleana** (Hass.) Kütz.

S.W.—Dewsbury (C. B. Crawshaw). Keighley.

132. **Spirogyra Hassallii** (Jenner) Petit.

S.E.—Newsholme, near Howden.

133. **Spirogyra insignis** (Hass.) Kütz.

S.W.—Near Mirfield. Near Bradford. Wilsden.

N.W.—Near Sedbergh.

134. **Spirogyra gracilis** (Hass.) Kütz. [Syn. *S. flavescens* (Hass.) Kütz., forma *gracilis* (Hass.) Cooke, and forma *parva* (Hass.) Cooke; *Zygnema gracile* Hass.; *Z. parva* Hass.].

S.W.—In dam at Kexborough (C. B. Crawshaw and C. P. Hobkirk).

MID W.—Ilkley.

N.W.—Lund's Fell.

Var. **flavescens** (Hass.) Rabenh. [Syn. *S. flavescens* (Hass.) Kütz.; *Zygnema flavescens* Hass.].

S.W.—Soothill, Dewsbury (C. B. Crawshaw). Holmfirth (C. P. Hobkirk). Cullingworth.

MID W.—Roundhay (W. B. Turner). Baildon. Rombald's Moor. Austwick. Grassington.

N.W.—Cronkley Fell.

N.E.—Strensall. Scarborough Mere.

135. **Spirogyra communis** (Hass.) Kütz. [Syn. *Zygnema commune* Hass.; *Spirogyra longata* (Vauch.) Wittr., 1872].

S.W.—Fixby. Bradford.

MID W.—Adel Bog (W. B. Turner). Malham.

136. **Spirogyra Jurgensi** Kütz.

MID W.—Baildon Moor.

137. **Spirogyra catæniformis** (Hass.) Kütz.

N.E.—Terrington.

S.E.—Newsholme, near Howden.

138. **Spirogyra varians** (Hass.) Kutz.

MID W.—Baildon Moor (vii. 1895). Ribblehead (iv. 1895).

N.E.—Terrington (vi. 1898). Malton.

S.E.—Newsholme, near Howden.

139. **Spirogyra longata** (Vauch.) Kütz.

[Syn. *Conjugata longata* Vauch.].

S.W.—Thornton Moor. Frizinghall. Near Keighley.

MID W.—Baildon. Adel (J. Abbott). Grassington. Ribblehead.

N.W.—Mickle and Cronkley Fells. Birkdale Tarn Moss.

N.E.—Seamer. Scarborough Mere.

S.E.—Newsholme, near Howden.

140. **Spirogyra pellucida** (Hass.) Kütz.

[Syn. *Zygnema pellucidum* Hass.].

S.W.—Hunslet (J. Abbott).

MID W.—Harrogate (W. B. Turner).

We have not seen this characteristic species from Yorkshire, and should much like to confirm the records by finding further specimens. For a complete account of its characters and peculiarities see G. S. West, 'Alga-Flora of Cambs.,' Journ. of Bot., 1899, p. 109-110.

141. **Spirogyra porticalis** (Vauch.) Cleve [Syn. *S. quinina* (Ag.) Kütz.; *S. porticalis* var. *quinina* (Ag.) Cooke].

S.W.—Upper Bradfield (Rev. R. A. Gatty). Sharlston (H. F. Parsons). Allerton. Bradford. Frizinghall.

MID W.—Roundhay (J. Abbott). Baildon. Cowside Beck, Arncliffe.

N.E.—Scarborough Mere! (G. Massee).

142. **Spirogyra condensata** (Vauch.) Kütz.

S.W.—Howley near Dewsbury (C. B. Crawshaw and C. P. Hobkirk). Near Bradford.

MID W.—Baildon.

N.W.—Great Shunnor Fell. River Ure. Reeth.

N.E.—Scarborough Mere.

143. **Spirogyra velata** Nordst.

MID W.—In stream, Shipley Glen. A rather smaller form than the type.

144. **Spirogyra nitida** (Dillw.) Link.

S.W.—Howley, near Dewsbury (C. B. Crawshaw and C. P. Hobkirk). Bradford. Wilsden. Marley, near Bingley.

MID W.—Bramhope and Adel (J. Abbott). Harrogate (T. Hick). Malham.

N.E.—Strensall (W. B. Turner). Scarborough Mere.

145. **Spirogyra crassa** Kütz.

S.W.—Doncaster. Near Heckmondwike (C. B. Crawshaw and C. P. Hobkirk). Manningham.

N.W.—Sedbergh.

N.E.—Scarborough Mere.

GENUS CHOASPIS S. F. Gray, 1821.

146. **Choaspis stictica** (Eng. Bot.) O.K., 1891 [Syn. *Conferva stictica* Eng. Bot.; *Choaspis serpentaria* S. F. Gray, 1821; *Sirogonium sticticum* Kütz., 1843].

S.W.—Keighley.

MID W.—Hawksworth. Baildon. Ingleton.

The habitat given by Rabenhorst (Flor. Europ. Algar., iii., p. 256), is 'in stagnis.' We have never obtained this plant except where the water was running, generally at a spring and attached to stones over which the water was flowing fairly fast.

Gray's description of *Choaspis* (Arrang. Brit. Pl., 1821, vol. 1, p. 299) is a good one of the genus and twenty-two years previous to Kützing's description of *Sirogonium*. His remark 'not slippery' is quite correct, and *Choaspis* is readily distinguished from *Spirogyra*, *Zygnema*, etc., by touch alone.

FAMILY *DESMIDIACEÆ*.

GENUS GONATOZYGON DeBary, 1856; em. 1858.

147. **Gonatozygon Ralfsii** DeBary.

S.W.—Hebden Bridge, abundant in dam (viii. 1895). Cullingworth (with zygospores).

MID W.—Moor Allerton (W. B. Turner). Wigton Moor. Staveley Dam, near Knaresborough. Cocket Moss, near Giggleswick.

N.W.—Sedbergh, abundant (with zygospores, ix. 1899).

N.E.—Strensall! (W. B. Turner).

S.E.—Riccall Common.

148. **Gonatozygon Brebissonii** DeBary.

S.W.—Cullingworth.

MID W.—Adel Bog. Malham Tarn. Cocket Moss, near Giggleswick. Penyghent. Cam Fell.

N.W.—Great Shunnor Fell.

N.E.—Strensall. Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

Var. **minutum** Nob. [Syn. *G. minutum* West].

MID W.—Cocket Moss, near Giggleswick.

S.E.—Riccall Common.

Var. **læve** (Hilse) Nob.

[Syn. *G. læve* Hilse, 1878; West, 1889].

MID W.—Cocket Moss, near Giggleswick. Penyghent.

N.W.—Mickle Fell.

149. **Gonatozygon pilosum** Wolle.

S.E.—Skipwith Common.

150. **Gonatozygon Kinahani** (Arch.) Rabenh.

MID W.—Malham Tarn, abundant in washings of *Callitriche*, (vii. 1891). Penyghent.

N.E.—Strensall Common.

GENUS SPIROTÆNIA Bréb., 1844.

151. **Spirotænia condensata** Bréb.

S.W.—Ogden Clough (length of cell, 186-192 μ; breadth, 26-28 μ). Cullingworth.

MID W.—Adel Bog (W. B. Turner). Ilkley (W. H. Dikes). Cocket Moss, near Giggleswick.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk. Carlton Bank. Stokesley.

152. **Spirotænia bryophila** (Bréb.) Rabenh.
[Syn. *S. musicola* DeBary].

MID W.—Shipley Glen (iv. 1895), forming a thin gelatinous stratum amongst mosses on dripping rocks.

153. **Spirotænia minuta** Thur.

N.E.—Pilmoor, near Thirsk, very abundant.

Var. **eboracensis** West & G. S. West.

MID W.—Cam Fell, not uncommon along with *Cylindrocystis crassa*, *Penium digitus*, *Hyalotheca dissiliens*, etc., in peat bogs.

This variety is relatively shorter in proportion to its breadth than the type; it has also blunter ends and more turns of the spiral. Length, 30-32 μ; breadth, 7-8 μ.

154. **Spirotænia turfosa** West & G. S. West.

Medium-sized; cells sub-cylindrical, elongate, nearly straight, or slightly curved, about twelve times longer than the diameter, gradually attenuated to each pole, apices obtuse; with a single parietal chromatophore, making $1\frac{1}{2}$ to 2 turns and containing a few small pyrenoids. Length, 100-102 μ; breadth, 7·5-8·5 μ; breadth of apices, about 4 μ.

MID W.—Ilkley, in peaty pools.

This species approaches *S. parvula* Arch., but is of much larger size, is proportionately longer, has more rounded and relatively wider ends, and has more turns of the spiral.

155. **Spirotænia fusiformis** West & G. S. West.

Small, elongate; cells straight or often slightly oblique, ten to twelve times longer than the diameter, cylindrico-fusiform, attenuated towards the apices which are acute but rounded; with a single parietal chromatophore rather irregularly disposed from pole to pole and making about half a turn. Length, 42-58 μ; breadth, 4·3-4·6 μ.

MID W.—Cowgill Wold Moss, Widdale Fell, in peaty pools amongst *Sphagnum cuspidatum* var. *plumosum*.

The cells were solitary or in pairs (after division), and occurred somewhat sparingly among a large quantity of *Arthrodesmus Incus*. It was very difficult to determine the precise nature of the spiral, because of its irregularity and the small size of the plant; it only made from half to three-quarters of a turn, and the protoplasm (outside the spiral) contained some large granules.

156. **Spirotænia obscura** Ralfs.

N.E.—Terrington, abundant (vi. 1898).

157. **Spirotænia acuta** Hilse.

N.E.—Pilmoor, near Thirsk.

158. **Spirotænia tenerrima** Arch.

N.E.—Pilmoor, near Thirsk.

GENUS MESOTÆNIUM Näg., 1849.

159. **Mesotænium DeGreyii** Turn.

MID W.—Blubberhouses (W. B. Turner). Ilkley. Simon Seat. Black Hill, near Settle.

160. **Mesotænium mirificum** Arch.

S.W.—Ogden Clough, forming gelatinous masses on dripping shale rocks. Length, 25-36 μ; breadth, 15-18 μ.

MID W.—Ingleton.

161. **Mesotænium macrococcum** (Kütz.). [Syn. *Palmoglœa macrococcum* Kütz., 1845; *Mesotœnium Braunii* DeBary, 1858].

S.W.—Hebden Bridge.

MID W.—Not unfrequent among wet mosses in narrow glens. Adel Bog (W. B. Turner). Above Eldwick. On stones in stream near Giggleswick; also among wet mosses near Giggleswick. Linn Ghyll.

N.W.—Sedbergh.

Var. **micrococcum** (Kütz.) Kirchn. [Syn. *Palmoglœa micrococca* Kütz.; *Mesotœnium Braunii* var. *minus* De Bary].

MID W.—On stones in stream, near Giggleswick.

S.E.—East of Selby.

162. **Mesotænium chlamydosporum** DeBary.

MID W.—Above Eldwick. Black Hill, near Settle. Cowgill Wold Moss, Widdale Fell.

N.W.—Lund's Fell, at 2,000 feet. Cautley Spout.

Length, 25-32·5 μ; breadth, 12 μ.

163. **Mesotænium caldariorum** (Lagerh.) Hansg.

S.W.—Forming a green gelatinous stratum with *Dactylothece Braunii*, in greenhouse, Bradford (ix. 1896).

The figure given by Turner (in Kongl. Sv. Vet.-Akad. Handl. Bd. 25, no. 5, 1892, t. 1, f. 23) does not at all represent the species. There is an almost imperceptible constriction in the middle of the cell, and the cells are somewhat suddenly attenuated near the apices, which are rounded.

It has not previously been recorded for the British Isles.

164. **Mesotænium Endlicherianum** Näg.

S.W.—Damp shady rocks near Bingley.

MID W.—Ingleton. Bowland Knotts. Penyghent. Old Cote Moor. Cowgill Wold Moss, Widdale Fell.

N.W.—Lund's Fell.

Length, 25-27 μ; breadth, 8-9 μ.

Var. **grande** Nordst.

S.W.—Cragg Vale, towards Blackstone Edge.

MID W.—Cocket Moss, near Giggleswick. Black Hill, near Settle.

Length, 52 μ; breadth, 12·5 μ.

165. **Mesotænium purpureum** West & G. S. West.

Cells free-swimming, cylindrical, and slightly curved, $3\frac{1}{2}$ to $4\frac{1}{2}$ times longer than the diameter, poles rounded; chromatophores purple, not interrupted in the middle of the cells.

Length, 32-46 μ; breadth, 9·5-10 μ.

MID W.—Old Cote Moor, in peat bogs.



GENUS CYLINDROCYSTIS MENEGH., 1838.

166. **Cylindrocystis Brebissonii** Menegh.

[Syn. *Penium Brebissonii* (Menegh.) Ralfs].

A general and widely distributed species, especially on heaths and in moorland districts.

S.W.—Goole Moor (H. F. Parsons). Thornton Moor. Ogden Clough. Denholme. Cullingworth. Near Keighley.

MID W.—Moor Allerton (W. B. Turner). Adel Bog. Bride Cross, above Farnley Moor. Leathley. Near Norwood Hall, above Lindley Reservoir. Ilkley (W. H. Dikes). Boston Spa. Wigton Moor. Earl's Seat. Malham Tarn Bog. Cocket Moss, near Giggleswick. Ingleton. Ingleborough. Black Hill, near Settle. Penyghent. Cray Moss. Oughtershaw Tarn. Cam Fell. Ribblehead (with zygospores in abundance). Whernside, at 2,000 ft.

N.W.—Baugh Fell. Sedbergh. Mickle and Cronkley Fells (with zygospores). Great Shunnor Fell; a pure gathering obtained at over 2,200 ft. Penhill Beacon. Mossdale Moor, Widdale Fell. Bog near Widdale Beck. Lund's Fell, up to 2,000 ft. Dodd Fell, at 2,000 ft. Snaizeholme Fell.

N.E.—Strensall Common (with zygospores). Pilmoor, near Thirsk. Terrington. Carlton Bank. Peat deposit, Filey. Near Scarborough.

S.E.—Riccall Common. Skipwith Common.

167. **Cylindrocystis crassa** DeBary.

S.W.—Ogden Clough. Near Keighley.

MID W.—Adel Bog. Blubberhouses (W. B. Turner). Simon Seat. Ilkley. Cocket Moss, near Giggleswick. Ingleborough. Moughton Fell. Penyghent and Linn Ghyll. Old Cote Moor. Near Buckden. Cam Fell (pure gathering). Whernside, at 2,000 ft.

N.W.—Cautley Spout and Sedbergh. Mickle and Cronkley Fells. Great Shunnor Fell. Lund's Fell. Mossdale Moor, Widdale Fell. Hunter's Hole, Craydale Moor (1,900 ft.).

N.E.—Strensall.

S.E.—East of Selby.

168. **Cylindrocystis diplospora** Lund.

S.W.—Cullingworth.

Mid W.—Adel Dam. Blubberhouses (W. B. Turner). Ingleborough. Whernside.

N.W.—Mickle Fell. Great Shunnor Fell. Gormire (W. B. Turner). Birkdale Tarn Moss.

N.E.—Pilmoor, near Thirsk. Peat deposit, Filey.

Var. **major** West.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common (forma *constricta* West).

Genus PENIUM Bréb., 1844.

169. **Penium cylindrus** (Ehrenb.) Bréb.

S.W.—Cullingworth.

N.W.—Mickle Fell.

170. **Penium rufescens** Cleve, 1864.

[Syn. *Penium rufopellitum* Roy, 1877].

N.W.—Cronkley Fell.

171. **Penium exiguum** West forma **Lewisii** (Turn.) West & G. S. West.

S.W.—Keighley Moor.

172. **Penium Digitus** (Ehrenb.) Bréb.

[Inclus. *Penium lamellosum* (Bréb.) Kütz.].

Generally distributed and more or less abundant in upland bogs.

S.W.—Frizinghall. Cullingworth. Ogden Clough. Keighley Moor.

Mid W.—Adel Dam! (W. B. Turner). Eldwick. Rombald's Moor. Ilkley. Malham Tarn Bog. Black Hill, near Settle. Cocket Moss, near Giggleswick. Near Buckden. Cam Fell. Ribblehead. Cowgill Wold Moss, Widdale Fell. Whernside.

N.W.—Baugh Fell. Mickle and Cronkley Fells. Great Shunnor Fell. Mossdale Moor, Widdale Fell. Bog by Widdale Beck. Hunter's Hole, Craydale Moor (1,900 ft.).

N.E.—Strensall!; Gormire (W. B. Turner). Pilmoor, near Thirsk. Terrington. Carlton Bank. Stokesley.

S.E.—Riccall Common.

173. **Penium interruptum** Bréb.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk.

174. **Penium Libellula** (Focke) Nordst., 1888. [Syn. *Closterium Libellula* Focke, 1847; *Penium closterioides* Ralfs, 1848].

S.W.—Cullingworth.

MID W.—Ilkley (W. H. Dikes). Whernside (iii. 1893).

N.W.—Mickle and Cronkley Fells. Reeth.

N.E.—Seamer.

175. **Penium Navicula** Bréb.

S.W.—Thornton Moor. Keighley Moor.

MID W.—Baildon Moor. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Old Cote Moor, and near Buckden.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk (with zygospores, vii. 1898). Carlton Bank. Stokesley.

S.E.—Riccall Common.

176. **Penium oblongum** DeBary.

S.W.—Greetland, near Halifax. Ogden Clough. Keighley Moor.

MID W.—Adel (W. B. Turner). Above Eldwick. Ilkley. Ingleborough. Cray Tarn, 2,000 ft. Cam Fell. Ribblehead. Whernside.

N.W.—Mickle Fell. Great Sleddale. Mossdale Moor, Widdale Fell.

N.E.—Carlton Bank.

177. **Penium spinospermum** Joshua.

MID W.—Cowgill Wold Moss, Widdale Fell (with zygospores). Diam. zygosp. with processes 29-33 μ.

178. **Penium Mooreanum** Arch.

MID W.—Kildwick.

N.W.—Howgill Fells. Mickle Fell (with zygospores).

N.E.—Moorland stream, near Scarborough.

179. **Penium minutissimum** Nordst.

MID W.—Old Cote Moor (viii. 1896).

N.W.—Mickle Fell.

180. **Penium truncatum** Bréb.

S.W.—Thornton Moor, in a tumbling rill in abundance, covering *Scapania undulata*. Cullingworth.

MID W.—Adel Bog. Penyghent.

N.E.—Peat deposit, Filey.

Forma **punctata** West.

S.W.—Greetland, near Halifax,

N.W.—Leeming.

181. **Penium margaritaceum** (Ehrenb.) Bréb.

MID W.—Ilkley (W. H. Dikes). Malham Cove (J. M. Kirk). Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

Var. **punctatum** Ralfs.

S.W.—Cullingworth.

MID W.—Wigton Moor.

182. **Penium spirostriolatum** Barker.

S.W.—Cullingworth.

MID W.—Cocket Moss, near Giggleswick. Oughtershaw Tarn, very abundant (viii. 1896).

N.W.—Hunter's Hole, Craydale Moor, 1,900 ft.

N.E.—Pilmoor, near Thirsk.

183. **Penium polymorphum** Perty.

More or less general in upland, peaty districts.

S.W.—Denholme. Oxenhope. Ogden Clough. Crimsworth Dean.

MID W.—Simon Seat. Malham Tarn Bog. Giggleswick Common. Bowland Knotts. Penyghent. Cray Tarn, 2,000 ft.

Old Cote Moor. Oughtershaw Tarn. Cam Fell. Cowgill Wold Moss, Widdale Fell. Whernside.

N.W.—Baugh Fell. Mickle Fell. Great Sleddale, and up to 2,200 ft. in Swaledale. Birkdale Tarn Moss. Lund's Fell. Mossdale Moor, Widdale Fell. Dodd Fell, 2,000 ft.

N.E.—Strensall.

184. **Penium cucurbitinum** Biss.

Among wet mosses, on dripping rocks, etc.

S.W.—Ogden Clough.

MID W.—Shipley Glen. Holden Ghyll, near Keighley. Near Ilkley. Penyghent. Cowgill Wold Moss, Widdale Fell.

S.E.—Riccall Common.

Var. **subpolymorphum** Nordst.

N.W.—Mickle Fell. Length 77-82 μ; breadth 35-38 μ.

185. **Penium crassiusculum** DeBary.

MID W.—Cowgill Wold Moss, Widdale Fell.

186. **Penium curtum** Bréb. [Syn. *Cosmarium curtum* (Bréb.) Ralfs; *Calocylindrus curtus* (Bréb.) Kirchn.].

MID W.—Near Ilkley! (Miss J. Town). Ingleton. Penyghent.

N.W.—Mickle Fell.

N.E.—Gormire (W. B. Turner).

Forma **major** Wille.

MID W.—Langcliffe, near Settle. Length 53 μ; breadth 28 μ; breadth of isthmus 26·5 μ.

Var. **obtusum** var. nov.

A large variety with the sides at the base of the semicells subparallel, with broader, subtruncate apices, below which the sides are very faintly hollowed. Length 41-45 μ; breadth 20-23 μ; breadth of constriction 19 μ.

MID W.—Ingleton, on wet rocks.

187. **Penium cruciferum** (DeBary) Wittr., 1882. [Syn. *Cosmarium ? cruciferum* DeBary, 1858].

S.W.—Ogden Clough. Keighley Moor.

MID W.--Above Eldwick. Baildon Moor, in profusion along with *Roya obtusa* var. *montana*, among *Rhacomitrium aciculare*. Plentiful in a ditch near Norwood Hall, above Lindley Reservoir. Appletreewick, in a trough. Cocket Moss, near Giggleswick. Old Cote Moor. Near Buckden. Cray Moss.

S.E.—Market Weighton.

188. **Penium inconspicuum** West.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common, very abundant.

189. **Penium minutum** (Ralfs) Cleve.

[Syn. *Docidium minutum* Ralfs].

MID W.—Adel Bog (W. B. Turner).

N.W.—Mickle Fell.

N.E.—Gormire (W. B. Turner).

S.E.—Riccall Common.

GENUS ROYA West & G. S. West, 1896.

190. **Roya obtusa** (Bréb.) West & G. S. West.

[Syn. *Closterium obtusum* Bréb.].

S.W.—Greetland, near Halifax. Cullingworth.

N.E.—Strensall.

Var. **montana** West & G. S. West.

S.W.—Ogden Clough, in profusion amongst *Mougeotia scalaris*, on dripping rocks.

MID W.—Baildon Moor, abundant along with *Penium cruciferum*, in washings of *Rhacomitrium aciculare*. Cocket Moss, near Giggleswick. Cam Fell.

191. **Roya Pseudoclosterium** (Roy)West & G. S. West.

[Syn. *Closterium Pseudoclosterium* Roy].

N.E.—Pilmoor, near Thirsk, not uncommon (vii. 1898). Length 98-140 μ; breadth 2·6-3 μ.

This is the first record for this species in England, although it is known from Scotland, N. Wales and W. Ireland.

GENUS CLOSTERIUM Nitzsch, 1817.

192. **Closterium Dianæ** Ehrenb.

S.W.—Rawcliffe Common. Askern. Bingley. Cullingworth.

MID W.—Markington, with zygospores! (Rev. J. S. Tute). Askwith (W. B. Turner). Baildon. Eldwick. Adel Bog. Rombald's Moor. Farnley. Leathley. Near Norwood Hall, above Lindley Reservoir. Malham Tarn. Moughton Fell. Wigton Moor.

N.W.—Mickle Fell.

N.E.—Gormire; Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington.

S.E.—Riccall and Skipwith Commons. Hornsea Mere.

A form with a distinctly granulate membrane was observed from Skipwith Common; the granules were large, but of slight elevation.

193. **Closterium Pseudodianæ** Roy.

MID W.—Roundhay Park, Leeds (vii. 1898). Cocket Moss, near Giggleswick (iv. 1898).

194. **Closterium parvulum** Näg.

Generally distributed throughout the county.

S.W.—Doncaster. Ogden Clough. Wibsey (with zygospores). Cullingworth. Bingley. Keighley Tarn, and near Keighley (with zygospores).

MID W.—Adel. Wigton Moor. Eldwick. Baildon Moor. Boston Spa. Cocket Moss, near Giggleswick. Ingleton. Ribblehead. Harrogate. Staveley Dam, near Knaresborough.

N.W.—Mickle Fell. Great Shunnor Fell. Lund's Fell.

N.E.—Strensall. Pilmoor, near Thirsk (with zygospores). Terrington. Near Scarborough. Levisham. Hayburn Wyke.

S.E.—Riccall Common.

Var. **angustum** var. nov.

Smaller than the typical form and considerably narrower.

Diam. 7·7 μ; apices 94-102 μ apart.

N.E.—Pilmoor, near Thirsk.

195. **Closterium arcuatum** Bréb.

S.E.—Skipwith Common.

196. **Closterium Jenneri** Ralfs.

S.W.—Wakefield (W. H. Dikes). Cullingworth.

MID W.—Adel Bog. Ilkley. Malham Tarn Bog. Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk. Terrington.

S.E.—Riccall Common.

Var. **robustum** G. S. West.

N.E.—Pilmoor, near Thirsk.

197. **Closterium incurvum** Bréb.

N.E.—Pilmoor, near Thirsk (vii. 1898). Breadth 11 μ; apices 52 μ apart.

198. **Closterium Venus** Kütz.

S.W.—Rawcliffe Common. Frizinghall. Cullingworth.

MID W.—Alwoodley (W. B. Turner). Eldwick. Wigton Moor. Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

N.E.—Strensall. Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Riccall and Skipwith Commons.

199. **Closterium eboracense** Turner.

[Syn. *C. Cucumis* Wolle non Ehrenb.].

S.W.—Campsall, Doncaster (W. B. Turner).

MID W.—Chapel-Allerton (W. B. Turner).

N.W.—Mickle Fell [recorded as *C. Cucumis*].

200. **Closterium Leibleinii** Kütz.

S.W.—Rawcliffe Common. Askern. Near Mirfield. Fixby. Frizinghall. Keighley.

MID W.—Baildon. Wigton Moor. Boston Spa. Arthington. Adel. Ilkley. Bolton Woods. Harrogate. Ribblehead.

N.W.—Mickle Fell.

N.E.—Strensall! (W. B. Turner). Scarborough Mere. River Derwent, Forge Valley. Saltburn.

S.E.—Market Weighton. Hornsea Mere. Beverley. Newsholme. Routh.

201. **Closterium moniliferum** (Bory) Ehrenb.

An abundant and widely-distributed species.

S.W.—Goole (W. G. Tacey). Hatfield Chase (J. M. Kirk). Drax (H. F. Parsons). Askern. Morley. Denholme. Hebden Bridge. Heaton.

MID W.—Adel Bog (W. B. Turner). Baildon. Rombald's Moor. Ilkley. Farnley. Bolton Woods. Harrogate (J. M. Kirk). Staveley Dam, near Knaresborough. Holden Ghyll, near Keighley. Near Settle. Malham Tarn. Cocket Moss, near Giggleswick. Moughton Fell. Penyghent. Buckden. Ingleton.

N.W.—Sedbergh and Cautley Spout. Mickle and Cronkley Fells.

N.E.—Thirkleby Park (W. B. Turner). Staindale. Pilmoor, near Thirsk. Terrington. Hayburn Wyke.

S.E.—Newsholme, near Howden.

202. **Closterium Ehrenberghii** Menegh.

General, but not abundant.

S.W.—Askern. Markington ! (Rev. J. S. Tute). Wakefield (W. H. Dikes). Denholme. Wibsey. Manningham. Armley (J. Abbott). Keighley.

MID W.—Hawksworth near Shipley (H. F. Parsons). Adel ! (J. Abbott). Baildon. Eldwick. Rombald's Moor. Near Boston Spa. Cocket Moss, near Giggleswick. Bowland Knotts. Horton-in-Ribblesdale. Moughton Fell.

N.W.—Great Shunnor Fell.

N.E.—Gormire (W. B. Turner). Strensall. Pilmoor, near Thirsk. Malton. Near Scarborough.

S.E.—Newsholme, near Howden.

203. **Closterium Malinvernianum** DeNot., 1865.

[Syn. ? *C. Cordanum* Gutw., 1896].

MID W.—Adel Bog (W. B. Turner). Boston Spa. Cam Fell.

N.E.—Pilmoor, near Thirsk.

204. **Closterium decorum** Bréb.

MID W.—Boston Spa.

205. **Closterium Cynthia** DeNot.

N.E.—Pilmoor, near Thirsk. Carlton Bank.

206. **Closterium acerosum** (Schrank) Ehrenb.

S.W.—Rawcliffe Common. Hatfield Chase (J. M. Kirk). Wibsey. Frizinghall. Cullingworth. Saltaire. Farnley. Keighley, with zygospores.

MID W.—Markington, with zygospores! (Rev. J. S. Tute). Baildon. Eldwick. Ben Rhydding. Ingleborough. Horton-in-Ribblesdale. Penyghent.

N.W.—Great Shunnor Fell.

N.E.—Gormire (W. B. Turner). Seamer. Scarborough Mere. River Derwent, Forge Valley.

S.E.—Skipwith Common. Brackenholme. Newsholme, near Howden. Beverley.

Var. **truncatum** Gutw.

S.W.—Rawcliffe Common. Nab Wood, near Bingley.

207. **Closterium lanceolatum** Kütz.

S.W.—Heaton. Allerton. Frizinghall. Cullingworth. Near Keighley.

MID W.—Roundhay. Adel Bog (W. B. Turner). Otley. Bolton Woods. Moughton Fell. Penyghent.

N.W.—Cronkley Fell.

N.E.—Hayburn Wyke. Gormire (W. B. Turner). Carlton Bank. Near Scarborough.

S.E.—Hornsea Mere. Waghen.

208. **Closterium Lunula** (Müller) Nitzsch.

MID W.—Somewhat rare. Markington! (Rev. J. S. Tute). Ilkley. Harrogate! (J. M. Kirk). Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

S.W.—Denholme. Crimsworth Dean. Esholt. Allerton (large forms; diam. 108 μ).

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Kirkham Abbey (J. M. Kirk).

Var. **intermedium** Gutw.

MID W.—Bog two miles south of Clapham.

This variety has not previously been recorded for the British Isles.

209. **Closterium sigmoideum** Lagerh. & Nordst.

MID W.—Eldwick, abundant.

From the dorsal view this species possesses a regular and well-marked sigmoid curvature. It is nearest to *Cl. Lunula* but is not so robust, and the apices though possessing the slight but characteristic recurvature of the latter species, are narrower. The number of moving corpuscles in each apical locellus was usually about twenty, but sometimes they were as few as five at one pole though normal at the other. There were eight to ten pyrenoids in each semicell. Length 310—330 μ; breadth 35—44 μ.

This species has only previously been seen from Brazil.

Forma **major.**

Length 482—552 μ; breadth 47—58 μ.

MID W.—Eldwick, with the typical form, but more abundant.

210. **Closterium peracerosum** Gay.

S.W.—Rawcliffe Common.

211. **Closterium littorale** Gay.

N.W.—Masham.

N.E.—In stream, Rievaulx Abbey. Stokesley.

212. **Closterium tumidum** Johnson 1895.

[Syn. *Cl. Cornu* Wille non Ehrenb.].

MID W.—Near Norwood Hall, above Lindley Reservoir. Ribblehead.

213. **Closterium Cornu** Ehrenb.

S.W.—Greetland, near Halifax. Cullingworth.

MID W.—Adel Bog (J. Abbott). Eldwick. Ilkley (W. H. Dikes). Cocket Moss, near Giggleswick. Moughton Fell. Ribblehead.

N.W.—Mickle Fell. Lund's Fell.

N.E.—Gormire (W. B. Turner).

214. **Closterium didymotocum** Corda.

[Syn. *C. antiacerosum* DeNot.].

MID W.—Cocket Moss, near Giggleswick.

215. **Closterium abruptum** West.

MID W.—Above Eldwick. Cocket Moss, near Giggleswick.
N.W.—Mickle Fell.

216. **Closterium toxon** West.

N.E.—Pilmoor, near Thirsk.
S.E.—Skipwith Common.

217. **Closterium pusillum** Hantzsch. var. **major** Racib.

MID W.—Cocket Moss, near Giggleswick.
N.W.—Mickle Fell.

218. **Closterium prælongum** Bréb.

MID W.—Malham Tarn Bog. Boston Spa.
S.E.—Riccall Common.

Forma **brevior** West.

S.W.—Rawcliffe Common. Heaton.
MID W.—Malham Tarn.
N.E.—Terrington.

219. **Closterium gracile** Bréb.

MID W.—Wigton Moor. Cocket Moss, near Giggleswick.
N.W.—Great Shunnor Fell.
N.E.—Pilmoor, near Thirsk. Terrington.
S.E.—Riccall and Skipwith Commons.

220. **Closterium aciculare** Tuffen West.

Recorded from 'Yorkshire' in Cooke's Brit. Desm., p. 37.

221. **Closterium angustatum** Kütz.

MID W.—Cocket Moss, near Giggleswick.
N.E.—Strensall Common (W. B. Turner).

222. **Closterium costatum** Corda.

S.W.—Cullingworth.
MID W.—Cocket Moss, near Giggleswick.
N.W.—Mickle and Cronkley Fells. Great Shunnor Fell.
N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington.

223. **Closterium striolatum** Ehrenb.

S.W.—Greetland, near Halifax. Frizinghall. Cullingworth. Keighley Moor.

MID W.—Adel Bog. Baildon. Rombald's Moor. Eldwick. Ilkley! (W. H. Dikes). Wigton Moor. Cocket Moss, near Giggleswick. Cam Fell.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Bog near Widdale Beck.

N.E.—Pilmoor, near Thirsk. Terrington. Carlton Bank. Seamer.

S.E.—Riccall and Skipwith Commons.

Var. **orthonotum** Roy.

MID W.—Above Eldwick. Black Hill, near Settle. Malham Tarn Bog. Whernside.

224. **Closterium intermedium** Ralfs.

S.W.—Cullingworth.

MID W.—Baildon. Ilkley (W. H. Dikes). Cocket Moss, near Giggleswick. Whernside.

N.W.—Great Shunnor Fell.

N.E.—Strensall.

S.E.—Skipwith Common! (Rev. W. Fowler).

Var. **sculptum** Racib. forma **eboracense** Turner.

N.E.—Strensall (W. B. Turner).

Var. **hibernicum** West.

N.E.—Terrington.

225. **Closterium ulna** Focke, 1847.

[Syn. *Closterium directum* Arch. 1862].

MID W.—Cocket Moss, near Giggleswick, and Giggleswick Common. Bog two miles south of Clapham.

226. **Closterium attenuatum** Ehrenb.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

227. **Closterium lineatum** Ehrenb.

S.W.—Frizinghall.

MID W.—Adel Bog. Baildon. Wigton Moor.

N.W.—Mickle Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Skipwith Common.

228. **Closterium juncidum** Ralfs.

MID W.—Moor-Allerton (W. B. Turner). Baildon. Wigton Moor. Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner).

S.E.—Riccall and Skipwith Commons.

229. **Closterium turgidum** Ehrenb.

N.W.—Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk.

230. **Closterium Pritchardianum** Arch.

S.W.—Crimsworth Dean.

S.E.—Market Weighton.

231. **Closterium pronum** Bréb.

S.W.—Rawcliffe Common. Keighley Moor.

MID W.—Whernside.

N.W.—Mickle Fell.

S.E.—Skipwith Common! (Rev. W. Fowler).

232. **Closterium subpronum** West.

MID W.—Malham Tarn.

N.E.—Pilmoor, near Thirsk.

S.E.—Sandholme.

233. **Closterium ceratium** Perty.

N.W.—Mickle Fell.

234. **Closterium acutum** (Lyngb.) Ralfs.

S.W.—Cullingworth. Keighley Tarn.

MID W.—Markington, with zygospores! (Rev. J. S. Tute). Adel Bog (W. B. Turner). Eldwick. Bride Cross, above Farnley Moor. Bowland Knotts. Staveley Dam, near Knaresborough.

N.W.—Mickle Fell. Reeth.

N.E.—Strensall! (W. B. Turner). Scarborough Mere. Seamer.

S.E.—Routh.

Var. **linea** (Perty) Nob. [Syn. *Closterium linea* Perty].

MID W.—Cocket Moss, near Giggleswick. Cowgill Wold Moss, Widdale Fell.

N.W.—Mickle Fell.

Closterium linea differs so little from *C. acutum* that it can only be considered as a variety of the latter species. Moreover, the zygospores of the two plants are precisely alike.

235. **Closterium subulatum** (Kütz.) Bréb.

MID W.—Rombald's Moor, very abundant, associated with *Cosmarium pseudarctoum* in washings of *Potamogeton polygoni folius*. Cocket Moss, near Giggleswick. Cam Fell.

N.W.—Great Shunnor Fell. Lund's Fell. Hunter's Hole, Craydale Moor (1,900 feet).

236. **Closterium Ralfsii** Bréb.

S.W.—Cullingworth.

237. **Closterium Kützingii** Bréb.

S.W.—Goole ! (W. B. Turner).

MID W.—Cocket Moss, near Giggleswick.

N.E.—Strensall. Pilmoor, near Thirsk.

238. **Closterium rostratum** Ehrenb.

S.W.—Goole (H. F. Parsons). Greetland, near Halifax. Wibsey. Nab Wood, near Bingley (with zygospores). Cullingworth.

MID W.—Markington ! (Rev. J. S. Tute). Askwith Moor (W. B. Turner). Adel Bog ! (J. Abbott). Eldwick. Wigton Moor. Cocket Moss, near Giggleswick. Giggleswick Common. Bowland Knotts. Pateley Bridge (with zygospores). Boston Spa. Cam Fell.

N.W.—Great Shunnor Fell. Cronkley Fell.

N.E.—Strensall. Terrington.

Generally distributed throughout the county, but not so frequent as in the south of England.

239. **Closterium setaceum** Ehrenb.

S.W.—Rawcliffe Common. Wakefield (W. H. Dikes).

MID W.—Meanwood (J. Abbott). Roundhay; Adel Bog (J. Abbott). Wigton Moor. Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

N.E.—Strensall (W. B. Turner).

GENUS DOCIDIUM Bréb., 1844.

240. **Docidium baculum** Bréb.

S.W.—Cullingworth.

MID W.—Adel Bog (W. B. Turner). Ilkley.

N.E.—Strensall! (W. B. Turner).

GENUS PLEUROTÆNIUM Näg., 1849.

241. **Pleurotænium Ehrenberghii** (Bréb.) DeBary, 1858. [Syn. *Docidium Ehrenbergii* Bréb., 1844].

S.W.—Near Mirfield. Cullingworth.

MID W.—Moor-Allerton; Adel! (W. B. Turner). Wigton Moor (pure gathering). Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell. Great Shunnor Fell.

N.E.—Gormire (W. B. Turner). Strensall. Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

Var. **granulatum** (Ralfs.) Hansg.

MID W.—Wigton Moor.

N.W.—Cronkley Fell. Great Shunnor Fell.

242. **Pleurotænium Trabecula** (Ehrenb.) Näg.

S.W.—Fixby.

MID W.—Roundhay Park, Leeds.

N.E.—Terrington.

Forma **clavata** (Kütz.) Reinsch. [Syn. *P. clavatum* (Kütz.) DeBary; *Docidium clavatum* Kütz.].

MID W.—Meanwood; Roundhay! (W. B. Turner). Ilkley (W. H. Dikes).

N.W.—Cronkley Fell. Great Shunnor Fell.

N.E.—Strensall; Gormire (W. B. Turner).

243. **Pleurotænium coronatum** (Bréb.) Rabenh. [Syn. *Docidium coronatum* Breb.].

N.E.—Pilmoor, near Thirsk.

Var. **nodulosum** (Bréb.) West & G. S. West.

[Syn. *Docidium nodulosum* Bréb.].

MID W.—Adel Bog (W. B. Turner).

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington. Carlton Bank.

—— —— Forma **labiata** Turn.

[Syn. *Docidium nodulosum* var. *labiatum* Turn.].

N.E.—Gormire (W. B. Turner).

NOTE.—This was recorded in the Naturalist, Sept., 1887, p. 275, as '*Docidium truncatum* γ *labiatum* Turn.,' but in the October number, p. 290, he stated this to be an error, and that it should be *D. nodulosum* γ *labiatum* Turn.

244. **Pleurotænium Hutchinsonii** (Turn.).

[Syn. *Docidium Hutchinsonii* Turn.].

N.E.—Strensall Common (W. B. Turner).

245. **Pleurotænium truncatum** (Bréb.) Näg.

[Syn. *Docidium truncatum* Bréb.].

S.W.—Rawcliffe Common.

MID W.—Shipley Glen. Ilkley (W. H. Dikes). Malham Cove (J. M. Kirk). Staveley Dam, near Knaresborough.

N.E.—Gormire (W. B. Turner). Strensall.

Var. **crassum** Boldt.

N.E.—Gormire (W. B. Turner).

GENUS TETMEMORUS Ralfs, 1844.

246. **Tetmemorus Brébissonii** (Menegh.) Ralfs.

S.W.—Near Halifax. Cullingworth.

MID W.—Adel Bog. Blubberhouses (W. B. Turner). Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Ingleborough. Cam Fell.

N.W.—Mickle Fell. Cotterdale. Bog near Widdale Beck.

N.E.—Strensall! (W. B. Turner).

247. **Tetmemorus granulatus** (Bréb.) Ralfs.

S.W.—Fairly general, but not common. Rawcliffe Common.

Greetland, near Halifax. Ogden Clough. Cragg Vale, towards Blackstone Edge. Cullingworth. Keighley Moor.

MID W.—Austwick. Eldwick. Baildon. Wigton Moor. Roundhay; Adel Bog! (J. Abbott). Ilkley! (W. H. Dikes). Harrogate (J. M. Kirk). Bride Cross, above Farnley Moor. Malham Tarn Bog. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Cam Fell. Ribblehead.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Lund's Fell. Birkdale Tarn Moss.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington. Carlton Bank.

S.E.—Skipwith Common.

Forma **minor** Nordst.

MID W.—Black Hill, near Settle.

N.W.—Great Sleddale. Bog near Widdale Beck.

248. **Tetmemorus lævis** (Kütz.) Ralfs.

S.W.—Ogden Clough. Thornton Moor, abundant among *Dicranella squarrosa.* Keighley Moor. Cullingworth.

MID W.—Near Hawksworth. Eldwick. Adel. Blubberhouses (W. B. Turner). Ilkley! (W. H. Dikes). Black Hill, near Settle. Bog two miles south of Clapham. Ingleton. Ingleborough. Old Cote Moor. Ribblehead. Whernside. Cowgill Wold Moss, Widdale Fell.

N.W.—Cautley Spout. Mickle Fell. Great Shunnor Fell. Cotterdale. Mossdale Moor, Widdale Fell.

N.E.—Carlton Bank.

S.E.—East of Selby.

Widely distributed in the upland districts, but rare in the lowlands.

249. **Tetmemorus minutus** DeBary.

N.W.—Dodd Fell, at 2,000 feet (iv. 1898).

GENUS EUASTRUM Ehrenb., 1832.

250. **Euastrum crassum** (Bréb.) Kütz.

S.W.—Cullingworth.

N.W.—Mickle and Cronkley Fells.

N.E.—Pilmoor, near Thirsk.

251. **Euastrum humerosum** Ralfs.

N.E.—Pilmoor, near Thirsk (vi. 1898).

252. **Euastrum oblongum** (Grev.) Ralfs.

S.W.—Rawcliffe Common. Cullingworth.

MID W.—Markington ! (Rev. J. S. Tute). Adel. Malham Tarn Bog. Cocket Moss, near Giggleswick. Giggleswick Common.

N.W.—Mickle and Cronkley Fells. Snaizeholme Fell.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk (with zygospores). Terrington.

S.E.—Skipwith Common.

253. **Euastrum didelta** (Turp.) Ralfs.

S.W.—Cullingworth.

MID W.—Eldwick. Adel ! (W. B. Turner). Ilkley (W. H. Dikes). Bride Cross, above Farnley Moor. Malham Cove (J. M. Kirk). Cocket Moss, near Giggleswick. Giggleswick Common. Ingleborough. Cam Fell.

N.W.—Mickle and Cronkley Fells. Great Sleddale. Lund's Fell. Bog near Widdale Beck.

N.E.—Strensall ! (W. B. Turner). Scarborough Mere.

254. **Euastrum affine** Ralfs.

MID W.—Bog two miles south of Clapham. Cam Fell. Cowgill Wold Moss, Widdale Fell. Whernside.

N.W.—Mickle Fell. Bog near Widdale Beck.

255. **Euastrum ampullaceum** Ralfs.

S.W.—Cullingworth.

MID W.—Adel Dam (W. B. Turner). Wigton Moor. Ilkley (W. H. Dikes). Whernside.

N.W.—Bog near Widdale Beck.

256. **Euastrum sinuosum** Lenorm.

[Syn. *E. circulare* Hass.].

MID W.—Baildon. Penyghent.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

257. **Euastrum Jenneri** Arch.

N.E.—Strensall Common.

258. **Euastrum cuneatum** Jenner.

MID W.—Bog two miles south of Clapham, abundant. Ingleborough. Near Buckden. Cam Fell. Cowgill Wold Moss, Widdale Fell.

N.W.—Mickle Fell. Lund's Fell. Mossdale Moor, Widdale Fell. Bog near Widdale Beck.

259. **Euastrum ansatum** Ehrenb.

S.W.—Cullingworth.

MID W.—Eldwick. Baildon. Wigton Moor. Adel Bog. Cocket Moss near Giggleswick. Bog two miles south of Clapham. Penyghent.

N.W.—Mickle Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington.

S.E.—Riccall and Skipwith Commons.

260. **Euastrum obesum** Josh.

N.W.—Mossdale Moor, Widdale Fell. Length, 111 μ; breadth, 59 μ; breadth of apex, 28 μ; breadth of isthmus, 21 μ.

Not previously recorded for the British Isles.

261. **Euastrum insigne** Hass.

S.W.—Cullingworth.

MID W.—Wigton Moor. Ilkley (W. H. Dikes). Whernside.

N.W.—Mickle and Cronkley Fells. Lund's Fell. Dodd Fell (at 2,000 feet).

262. **Euastrum rostratum** Ralfs.

N.W.—Cronkley Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

263. **Euastrum bidentatum** Näg.

[Syn. *E. elegans* var. *bidentatum* Jacobs].

MID W.—Malham Tarn Bog. Cocket Moss, near Giggleswick. Cowgill Wold Moss, Widdale Fell.

N.W.—Cronkley Fell. Bog near Widdale Beck.

264. **Euastrum lobulatum** Bréb.

[Syn. *E. erosum* Lund var. *notabile* West].

S.W.—Cragg Vale, towards Blackstone Edge. Keighley Moor.

MID W.—Malham Tarn Bog. Cocket Moss, near Giggleswick. Penyghent. Old Cote Moor. Cam Fell. Whernside.

N.W.—Mickle Fell. Lund's Fell.

S.E.—Riccall Common.

After much consideration we have come to regard the var. *notabile* we described of *E. erosum* (cfr. Journ. Roy. Micr. Soc., 1892, p. 723, t. ix., fig. 17) as identical with *E. lobulatum* Bréb., 1856. Brébisson's description and figure are not good, but yet the outward form, the size and the habit, admit of no other conclusion. The frequency of the plant in bog-gatherings, and its constant association with other Desmids that were perfectly familiar to Brébisson, also tend to confirm this view.

Cfr. also West & G. S. West in Journ. Bot., Aug. 1900, p. 290.

265.—**Euastrum erosum** Lund.

N.W.—Mickle Fell.

266.—**Euastrum pulchellum** Bréb.

S.E.—Riccall Common.

267.—**Euastrum elegans** (Bréb.) Kütz.

S.W.—Cullingworth.

MID W.—Adel (W. B. Turner). Eldwick. Wigton Moor. Malham Tarn. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. West of Selby.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

We regard *E. elegans* forma *declivis* Reinsch, 1867 (placed by Roy as *E. declive* in 1886) as a mere form of this species, not sufficiently deserving of a definite varietal name, much less to be placed as a distinct species.

268. **Euastrum binale** (Turp.) Ehrenb.

S.W.—Cullingworth.

MID W.—Blubberhouses; Adel! (W. B. Turner). Eldwick. Bride Cross, above Farnley Moor. Malham Tarn Bog. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Ingleborough. Oughtershaw Tarn. Ribblehead. Whernside.

N.W.—Mickle Fell. Great Shunnor Fell. Lund's Fell. Mossdale Moor, Widdale Fell (with zygospores). Bog near Widdale Beck. Dodd Fell (at 2,000 feet). Up to 2,000 feet on Widdale Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common. Skipwith Common! (Rev. W. Fowler).

Forma **minor** West.

MID W.—Adel Bog.

N.E.—Pilmoor, near Thirsk.

Forma **hians** West.

S.W.—Keighley Moor.

S.E.—Skipwith Common.

Var. **elobatum** Lund.

MID W.—Penyghent.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner).

S.E.—Riccall Common.

Var. **subelobatum** West.

MID W.—Oughtershaw Tarn.

N.W.—Baugh Fell. Cronkley Fell. Hunter's Hole, Craydale Moor (1,900 ft.).

269. **Euastrum denticulatum** (Kirchn.) Gay.

S.W.—Skelmanthorpe.

MID W.—Black Hill, near Settle. Malham Tarn. Bog two miles south of Clapham.

N.W.—Lund's Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

270. **Euastrum incavatum** Josh. & Nordst.

N.W.—Mickle Fell. Length, 35 μ; breadth, 20 μ; breadth of isthmus, 4·5 μ.

271. **Euastrum pectinatum** Bréb.

S.W.—Cullingworth.

MID W.—Adel Bog (with zygospores). Wigton Moor. Malham Tarn. Cocket Moss, near Giggleswick (with zygospores). Bog two miles south of Clapham.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

272. **Euastrum gemmatum** (Bréb.) Ralfs.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

273. **Euastrum verrucosum** Ehrenb.

S.W.—Rawcliffe Common.

MID W.—Bramhope (W. B. Turner). Ilkley (W. H. Dikes). Malham Tarn.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

274. **Euastrum insulare** (Wittr.) Roy 1883. [Syn. *E. binale* var. *insulare* Wittr. 1872; *Cosmarium insulare* Schmidle 1894].

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

275. **Euastrum crassicolle** Lund.

N.W.—Mickle Fell.

GENUS MICRASTERIAS Ag., 1827.

276. **Micrasterias oscitans** Ralfs var. **mucronata** (Dixon) Wille. [Syn. *M. mucronata* (Dixon) Rabenh.].

N.W.—Cronkley Fell. Lund's Fell (iv. 1898).

277. **Micrasterias truncata** (Corda) Bréb.

This is the most generally distributed species of the genus in Yorkshire, but it is by no means common; it seems to prefer peaty *Sphagnum*-pools.

S.W.—Cullingworth.

MID W.—Eldwick. Cocket Moss, near Giggleswick. Giggleswick Common. Bog two miles south of Clapham. Ingleborough.

N.W.—Mickle Fell. Lund's Fell. Mossdale Moor, Widdale Fell. Bog near Widdale Beck. Hunter's Hole, Craydale Moor (1,900 feet).

N.E.—Strensall. Pilmoor, near Thirsk. Terrington.

S.E.—Skipwith Common ! (Rev. W. Fowler).

278. **Micrasterias crenata** Bréb.

S.W.—Cullingworth.

MID W.—Eldwick. Ilkley (W. H. Dikes).

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall ! (W. B. Turner).

279. **Micrasterias papillifera** Bréb.

MID W.—Adel Dam (W. B. Turner).

S.W.—Cullingworth.

N.W.—Cronkley Fell. Birkdale Tarn Moss.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk. Terrington.

280. **Micrasterias apiculata** (Ehrenb.) Menegh. subspecies **fimbriata** (Ralfs) Nordst., 1888.

[Syn. *M. fimbriata* Ralfs, 1848].

S.W.—Cullingworth.

MID W.—Adel Dam (W. B. Turner). Eldwick.

281. **Micrasterias rotata** (Grev.) Ralfs.

S.W.—Cullingworth.

MID W.—Adel Bog. Harrogate (J. M. Kirk). Cocket Moss, near Giggleswick.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

282. **Micrasterias denticulata** Bréb.

Probably general, but very local.

S.W.—Cullingworth.

MID W.—Wigton Moor. Adel and Eldwick, pure gatherings.

Cocket Moss, near Giggleswick. Bowland Knotts. Bog two miles south of Clapham.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Strensall! (W. B. Turner). Seamer. Carlton Bank. Stokesley.

Var. **notata** Nordst.

N.E.—Terrington.

283. **Micrasterias Thomasiana** Arch.

MID W.—Malham Tarn Bog (iii. 1894).

N.E.—Pilmoor, near Thirsk. Terrington.

284. **Micrasterias Crux-melitensis** (Ehrenb.) Hass.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

285. **Micrasterias Americana** (Ehrenb.) Ralfs.

MID W.—Askwith Moor (W. B. Russell and R. Hebblethwaite). Cocket Moss, near Giggleswick (iv. 1898).

N.W.—Mickle Fell.

Var. **recta** Wolle, forma. (Cfr. Journ. Bot., Oct. 1889, t. 291, f. 13).

N.W.—Mickle Fell. Length, 117 μ; breadth, 98 μ; breadth of isthmus, 19 μ.

GENUS XANTHIDIUM Ehrenb., 1834.

286. **Xanthidium armatum** (Bréb.) Rabenh.

S.W.—Cullingworth.

MID W.—Adel. Ilkley (W. H. Dikes).

N.E.—Strensall (W. B. Turner).

287. **Xanthidium antilopæum** (Bréb.) Kütz.

[Syn. *X. fasciculatum* var. *polygonum* Ehrenb.].

MID W.—Wigton Moor. Bog two miles south of Clapham.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk (with zygospores, vi. 1898).

288. **Xanthidium cristatum** Bréb., 1848.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common.

289. **Xanthidium fasciculatum** Ehrenb.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

290. **Xanthidium Brébissonii** Ralfs.

MID W.—Bog two miles south of Clapham (iv. 1898).

N.E.—Strensall (W. B. Turner), a variety.

291. **Xanthidium aculeatum** Ehrenb.

MID W.—Ilkley (W. H. Dikes). Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common.

292. **Xanthidium variabile** West & G. S. West in Journ. Bot., Aug. 1900, p. 291. [Syn. *X. Smithii* Arch. var. *variabile* Nordst. 1887].

N.W.—Mickle Fell.

We have found this plant in many parts of England, and from some localities (especially certain *Sphagnum*-bogs) it is very abundant. It retains its distinctive characters in such a constant manner that we feel compelled to regard it as a distinct species from *X. Smithii*. Moreover, we never find *X. variabile* associated with *X. Smithii*; and although the former varies considerably, yet no forms are met with intermediate between the two species. (Cfr. G. S. West in Journ. Linn. Soc., Bot. vol. xxvii., 1899, p. 386, t. 8, f. 20—22).

293. **Xanthidium concinnum** Arch. 1883.

[Syn. *Arthrodesmus hexagonus* Boldt, 1885].

MID W.—Bog two miles south of Clapham.

GENUS COSMARIUM Corda, 1834.

294. **Cosmarium Ralfsii** Bréb.

MID W.—Cam Fell (viii. 1896).

N.W.—Mickle Fell. Lund's Fell (iv. 1898). Mossdale Moor, Widdale Fell. Bog near Widdale Beck.

295. **Cosmarium circulare** Reinsch.

N.W.—Mickle Fell.

296. **Cosmarium pachydermum** Lund.

MID W.—Malham Tarn. Penyghent.

N.E.—Pilmoor, near Thirsk.

Var. **minus** Nordst.

N.W.—Cautley Spout.

297. **Cosmarium Cucumis** Corda.

S.W.—Crimsworth Dean. Ogden Clough. Near Keighley.

MID W.—Baildon. Rombald's Moor. Wigton Moor. Moughton Fell. Penyghent. Ribblehead. Cowgill Wold Moss, Widdale Fell.

N.W.—Mickle and Cronkley Fells. Staindale. Near Moorcock Inn.

N.E.—Gormire, Strensall! (W. B. Turner). Scarborough Mere.

S.E.—Skipwith Common.

298. **Cosmarium Subcucumis** Schmidle.

S.W.—Ogden Clough, abundant along with *Closterium Ehrenbergii* among *Vaucheria* sp.

MID W.—In a ditch near Ilkley.

N.W.—Cautley Spout.

This species was described by Schmidle in Berichte der Naturf. Gesellsch. Freiburg, Bd. vii., Heft 1, p. 98, t. iv., f. 20—22. The Yorkshire specimens agree more with those from the south of England (cfr. Journ. Roy. Micr. Soc. 1897, p. 485) than with the original ones from Germany.

299. **Cosmarium subtumidum** Nordst.

MID W.—Bog two miles south of Clapham. Arncliffe.

N.W.—Cronkley Fell.

300. **Cosmarium cyclicum** Lund.

N.W.—Mickle Fell.

Var. **angulatum** West 1889. [Syn. ? *C. Nordstedtii* Reinsch; *C. cyclicum* var. *truncatum* Borge 1894].

MID W.—Penyghent (iv. 1896).

N.W.—Mickle Fell.

301. **Cosmarium monomazum** Lund.

MID W.—Penyghent.

Var. **polymazum** Nordst.

N.E.—Gormire (W. B. Turner).

302. **Cosmarium cœlatum** Ralfs.

S.W.—Cragg Vale towards Blackstone Edge. Ogden Clough. Cullingworth. Keighley Moor.

MID W.—Black Hill, near Settle. Malham Tarn Bog. Penyghent.

N.W.—Mickle and Cronkley Fells.

N.E.—Carlton Bank. Stokesley.

303. **Cosmarium subcrenatum** Hantzsch.

S.W.—Cragg Vale towards Blackstone Edge.

MID W.—Langcliffe, near Settle. Penyghent. Holden Ghyll, near Keighley.

N.W.—Cronkley Fell. Cautley Spout. Bog near Widdale Beck.

N.E.—Gormire (W. B. Turner).

304. **Cosmarium microsphinctum** Nordst.

MID W.—Dripping limestone rocks, Heseltine Ghyll, Penyghent. Near Ilkley! (Miss J. Town).

N.W.—Mickle Fell.

305. **Cosmarium dovrense** Nordst.

MID W.—Cowside Beck, Arncliffe (viii. 1896) in pure gelatincus masses on vertical dripping rocks. On wet rocks, Heseltine Ghyll, Penyghent.

This rare species was described by Nordstedt (in Wittr. & Nordst. Alg. Exsic. 1879, no. 255) as occurring among mosses on wet rocks on the Norwegian mountains.

It has not previously been recorded for the British Isles.

306. **Cosmarium quadrifarium** Lund. forma **hexasticha** (Lund.) Nordst. [Syn. *C. hexastichum* Lund.).

N.W.—Mickle Fell.

307. **Cosmarium Phaseolus** Bréb.

MID W.—Wigton Moor. Malham Tarn. Whernside (at 2,000 feet). Staveley Dam, near Knaresborough.

N.E.—Gormire (W. B. Turner). Strensall. Pilmoor, near Thirsk.

S.E.—Riccall Common.

308. **Cosmarium ornatum** Ralfs.

MID W.—Blubberhouses (W. B. Turner). Cocket Moss, near Giggleswick.

N.W.—Great Shunnor Fell.

N.E.—Strensall! (W. B. Turner).

S.E.—Riccall and Skipwith Commons.

309. **Cosmarium commissurale** Bréb.

S W.—Rawcliffe Common.

N.E.—Strensall.

310. **Cosmarium reniforme** (Ralfs) Arch.

MID W.—Wigton Moor.

N.E.—Gormire (W. B. Turner). Strensall. Pilmoor, near Thirsk. Carlton Bank. Stokesley.

S.E.—Riccall and Skipwith Commons.

311. **Cosmarium margaritiferum** (Turp.) Menegh.

S.W.—Hatfield Chase (J. M. Kirk).

MID W.—Malham Tarn.

N.E.—Strensall! (W. B. Turner). Gormire (W. B. Turner).

N.W.—Mickle and Cronkley Fells. Cotterdale.

S.E.—Riccall Common. Hornsea Mere.

312. **Cosmarium Brébissonii** Menegh.

S.W.—Cullingworth.

MID W.—Adel Bog. Blubberhouses (W. B. Turner). Malham Tarn Bog. Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Strensall.

Forma **erosa** West.

N.W.—Cronkley Fell.

313. **Cosmarium Logiense** Biss.

MID W.—Cocket Moss, near Giggleswick. Ingleton, Bowland Knotts.

N.W.—Mickle Fell. Great Shunnor Fell.

314. **Cosmarium granulatum** West.

MID W.—Crook Ghyll, near Buckden.

N.W.—Cronkley Fell.

315. **Cosmarium Portianum** Arch.

MID W.—Cocket Moss, near Giggleswick.

N.E.—Gormire (W. B. Turner). Pilmoor, near Thirsk (with zygospores).

S.E.—Riccall and Skipwith Commons.

316. **Cosmarium orthostichum** Lund.

S.W.—Cullingworth.

317. **Cosmarium solidum** Nordst.

N.W.—Cronkley Fell.

N.E.—Carlton Bank.

This plant was described by Nordstedt in Kongl. Sv. Vet.-Akad. Handl., Bd. 22, No. 8, 1888, p. 48, and was figured by him under the name of *Cosmarium punctulatum* in Öfvers. af K. Vet.-Akad. Förh., 1872, No. 6, t. vi., f. 1–2. It is, however, quite a distinct plant from *C. punctulatum* Bréb.

Previously unrecorded for the British Isles.

318. **Cosmarium trachypleurum** Lund.

N.E.—Pilmoor, near Thirsk (vi. 1898).

319. **Cosmarium isthmochondrum** Nordst.

S.W.—Near Keighley.

N.W.—Cautley Spout. Jervaulx Abbey.

N.E.—Pilmoor, near Thirsk.

320. **Cosmarium sphalerostichum** Nordst.

S.W.—Cullingworth.

MID W.—Cocket Moss, near Giggleswick. Arncliffe. Cam Fell. Ribblehead.

N.W.—Mickle and Cronkley Fells.

321. **Cosmarium Etchachanense** Roy & Biss.

MID W.—Langcliffe, near Settle. Cowside Beck, Arncliffe. Horton-in-Ribblesdale. Penyghent. Cowgill Wold Moss, Widdale Fell.

322. **Cosmarium undulatum** Corda.

S.W.—Rawcliffe Common. Cullingworth.

MID W.—Rombald's Moor. Ilkley (W. H. Dikes). Malham Tarn.

N.W.—Mickle Fell.

N.E.—Strensall.

S.E.—Riccall Common. Peat deposit, Filey.

Var. **minutum** Wittr.

N.E.—Strensall! (W. B. Turner).

323. **Cosmarium minutissimum** Arch.

N.E.—Pilmoor, near Thirsk (with zygospores).

The semi-cells were somewhat flattened at the apex, and the zygospore was rhomboido-elliptical. Length, 8·4 μ; breadth, 8·5 μ; breadth of isthmus, 2·7 μ; length of zygospore, 12 μ; breadth of zygospore, 10 μ.

324. **Cosmarium Scenedesmus** Delp.

MID W.—Malham Tarn.

S.E.—Skipwith Common.

325. **Cosmarium sphæroideum** West.

N.E.—Strensall Common.

326. **Cosmarium trachydermum** West & G. S. West.

MID W.—Cowgill Wold Moss, Widdale Fell.

Previously unrecorded for the British Isles.

327. **Cosmarium bioculatum** Bréb.

S.W.—Rawcliffe (H. F. Parsons). Halifax. In horse-trough, Allerton, near Bradford. Cullingworth.

MID W.—Adel Bog. Rombald's Moor. Malham Tarn. Bog two miles south of Clapham.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Strensall. Pilmoor, near Thirsk. Carlton Bank. Scarborough Mere.

S.E.—Riccall Common.

328. **Cosmarium tinctum** Ralfs.

S.W.—Thornton Moor. Cullingworth.

MID W.—Adel Bog. Baildon Moor. Ilkley. Bolton Woods. Cocket Moss, near Giggleswick. Ribblehead. Cam Fell.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Strensall.

S.E.—Riccall and Skipwith Commons.

329. **Cosmarium inconspicuum** West & G. S. West.

MID W.—Bog two miles south of Clapham (iv. 1898).

330. **Cosmarium asphærosporum** Nordst. 1879. [Syn. *C. Schliephackianum* Grunow forma *spetsbergensis* Nordst 1875].

MID W.—Penyghent.

331. **Cosmarium contractum** Kirchn.

MID W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

332. **Cosmarium Hammeri** Reinsch. 1867. [Syn. *C. homalodermum* Nordst. 1875].

S.W.—Ogden Clough.

MID W.—Baildon.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Reeth.

N.E.—Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Riccall Common. Peat deposit, Filey.

333. **Cosmarium galeritum** Nordst.

MID W.—Roundhay Park, Leeds. Malham Tarn, Cocket Moss, near Giggleswick. Penyghent.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

334. **Cosmarium Klebsii** Gutw.

N.E.—Pilmoor, near Thirsk.

Only previously recorded for the British Isles from the New Forest, Hants.

335. **Cosmarium Malinvernianum** (Racib.) Schmidle, 1894. [Syn. *C. subtholiforme* var. *Malinvernianum* Racib., 1889].

Var. **Badense** Schmidle, 1894.

[Syn. *C. subtholiforme* var. *Badense* Schmidle].

MID W.—Cocket Moss, near Giggleswick.

N.E.—Pilmoor, near Thirsk.

This plant is by no means an uncommon species in the boggy districts of the British Isles. It is described and fairly well figured by Schmidle in Flora oder allg. Botan. Zeitung, 1894, heft 1, p, 58, t. vii., f. 21. We have figured its zygospore in Journ. Roy. Micr. Soc., 1896, t. vii., f. 41, under the erroneous name of *C. confusum* Cooke var. *regularius* Nordst. The zygospores were from the extensive bog on Thursley Common, Surrey, and were not uncommon in a gathering made towards the end of June, 1895. Schmidle, in Oesterr. Bot. Zeitschrift, Jahrg. 1895, p. 21 (Sep.), remarks on its resemblance to *C. confusum* var. *regularius* and also to *C. præmorsum* Bréb. It certainly has some resemblance to the latter species, but we think no one could fail to readily discriminate between the two plants.

336. **Cosmarium confusum** Cooke var. **regularius** Nordst.

S.E.—Riccall and Skipwith Commons.

337. **Cosmarium præmorsum** Bréb.

S.W.—Cragg Vale, towards Blackstone Edge. Ogden Clough.

MID W.—Roundhay Park, Leeds. Eldwick. Staveley Dam, near Knaresborough. Near Ilkley. Ingleton.

N.W.—Sedbergh and Cautley Spout. Mickle and Cronkley Fells.

N.E.—Strensall. Pilmoor, near Thirsk. Malton. Stokesley. Scarborough Mere.

S.E.—Riccall Common. Market Weighton.

338. **Cosmarium quaternarium** Nordst.

MID W.—Baildon Moor. Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

339. **Cosmarium Sportella** Bréb.

MID W.—Cowside Beck, Arncliffe (viii. 1896).

340. **Cosmarium Corbula** Bréb.

MID W.—Cocket Moss, near Giggleswick (iv. 1898).

341. **Cosmarium Turpinii** Breb.

[Syn. *C. Turpinii* var. *Lundellii* Gutw. 1884].

S.W.—Marley, near Bingley.

MID W.—Roundhay Park, Leeds. Shipley Glen. Malham Tarn. Cocket Moss, near Giggleswick. Ingleton.

342. **Cosmarium Kjellmanii** Wille.

MID W.—Above Eldwick. Rombald's Moor.

N.W.—Near 'Moorcock Inn.'

Sub-sp. **grande** Wille.

MID W.—Baildon Moor.

Length, 45 μ; breadth, 42 μ; breadth of isthmus, 13 μ; thickness, 18 μ.

343. **Cosmarium quinarium** Lund.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

344. **Cosmarium anisochondrum** Nordst.

N.E.—Gormire (W. B. Turner).

345. **Cosmarium subpunctulatum** Nordst.

S.W.—Cullingworth. Wigton Moor.

S.E.—Riccall Common. Market Weighton.

Var. **Börgesenii** West.

S.W.—Cullingworth.

N.E.—Strensall Common.

346. **Cosmarium punctulatum** Bréb.

S.W.—Rawcliffe Common. Askern. Thornton Moor. Halifax. Cullingworth. Moor near Keighley.

MID W.—Adel Bog. Baildon. Wigton Moor. Ilkley. Staveley Dam, near Knaresborough. Malham Tarn. Cocket Moss, near Giggleswick. Ingleborough. Penyghent.

N.W.—Cronkley Fell. Cotterdale. Near 'Moorcock Inn.' Jervaulx Abbey.

N.E.—Strensall. Pilmoor, near Thirsk. Stokesley. Scarborough Mere.

S.E.—Riccall Common.

347. **Cosmarium humile** (Gay) Nordst.

[Syn. *C. celatum* Gay].

Var. **substriatum** (Nordst.) Schmidle.

[Syn. *C. substriatum* Nordst.].

S.W.—Rawcliffe Common.

MID W.—Penyghent. Staveley Dam, near Knaresborough. Wigton Moor.

N.E.—Strensall Common. Pilmoor, near Thirsk. Malton.

S.E.—Riccall Common. Skipwith Common. Market Weighton. Hornsea Mere.

Var. **striatum** (Boldt) Schmidle. [Syn. *C. striatum* Boldt].

N.E.—Pilmoor, near Thirsk.

C. humile, *C. striatum*, *C. substriatum*, and *C. danicum* are unquestionably all forms of the same species. This was first directly pointed out by Schmidle in Flora oder Allg. Bot. Zeitung, 1894, heft 1, p. 53; he afterwards placed *C. striatum*, *C. substriatum*, *C. danicum*, *C. subhumile*, and other forms as varieties of *C. humile*; cfr. Oesterr. Botan. Zeitschrift, 1895, nr. 7, p. 18 (Sep.).

348. **Cosmarium Blyttii** Wille.

S.W.—Cragg Vale, towards Blackstone Edge.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle and Cronkley Fells.

S.E.—Skipwith Common.

349. **Cosmarium Bœckii** Wille.

MID W.—Malham Tarn.

N.W.—Mickle Fell.

350. **Cosmarium subprotumidum** Nordst.

N.E.—Strensall Common.

Var. **Gregorii** (Roy & Biss.) Nob.

[Syn. *C. Gregorii* Roy & Biss.].

MID W.—Roundhay Park, Leeds.

N.E.—Pilmoor, near Thirsk.

S.E.—Hornsea Mere.

351. **Cosmarium subcostatum** Nordst.

MID W.—Shipley Glen. Ben Rhydding. Malham Tarn.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

352. **Cosmarium formosulum** Hoff.

MID W.—Eldwick.

N.E.—Strensall Common. Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

353. **Cosmarium nitidulum** De Not., 1867.

[Syn. *C. rectosporum* Turn., 1893].

S.W.—Cullingworth.

N.W.—Mickle Fell. Pilmoor, near Thirsk.

N.E.—Beast Cliff.

354. **Cosmarium pseudonitidulum** Nordst.

S.W.—Cullingworth.

N.W.—Mickle Fell.

355. **Cosmarium variolatum** Lund.

MID W.—Baildon.

356. **Cosmarium pseudopyramidatum** Lund.

S.W.—Cullingworth.

MID W.—Malham Tarn.

S.E.—Riccall Common.

357. **Cosmarium pyramidatum** Bréb.

S.W.—Cullingworth. Saltaire.

MID W.—Bramhope (W. B. Turner). Bog two miles south of Clapham. Moughton Fell. Penyghent.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Bog near Widdale Beck.

N.E.—Gormire. Strensall ! (W. B. Turner).

S.E.—Riccall Common.

358. **Cosmarium Nymannianum** Grun.

S.W.—Keighley Tarn.

N.W.—Great Shunnor Fell.

359. **Cosmarium granatum** Bréb.

MID W.—Baildon. Malham Tarn. Cowside Beck, Arncliffe. Penyghent. Cray Moss.

N.W.—Mickle Fell. Jervaulx Abbey.

N.E.—Strensall Common. Pilmoor, near Thirsk. Carlton Bank.

S.E.—Riccall and Skipwith Commons. Sandholme. Hornsea Mere.

This is the most universal and widely distributed species of the genus *Cosmarium*.

Var. **subgranatum** Nordst.

S.W.—Crimsworth Dean.

MID W.—Baildon. Ingleton. Half-a-mile south of Cray Moss. Boston Spa. Knaresborough. Holden Ghyll, near Keighley.

N.E.—Pilmoor, near Thirsk.

S.E.—Malton.

360. **Cosmarium Pokornyanum** (Grun.) Nob. [Syn. *Euastrum Pokornyanum* Grun., 1868; *E. binale* var. *angustatum* Wittr., 1872; *E. polare* Nordst., 1872; *C. angustatum* (Wittr.) Nordst., 1875].

MID W.—Helln Pot, near Selside, on wet rocks among *Glæocapsa* sp. Moughton Fell. Penyghent. South of Cray Moss.

N.W.—Mickle Fell. Mossdale Moor, Widdale Fell. Cowgill Wold Moss, Widdale Fell.

The description of *Euastrum Pokornyanum*, given by Grunow in Rabenh. Flor. Europ. Alg., iii., p. 185, agrees in every way with *C. angustatum* (Wittr.) Nordst. It is as follows:—'*E. minutum, quasi prioris* [*E. Ralfsii* Rabenh.] *infans; semicellulis trilobis, lobis basalibus brevibus integris vel margine crenato-bilobulatis, lobo polari porrecto subcuneato, apice truncato, leniter inciso-emarginato; cytiodermate lævi.*' The size of the plants is the same, and the habitats '*in locis paludosis*' and '*inter muscos madidos*' given for *E. Pokornyanum* are those of *C. angustatum*. Moreover, *E. Pokornyanum* Grun. var. *subcrassicolle* Gutw. (in Spraw. Kom. fizyjogr. Akad. Umiej. Krakow, tom. xxx., p. 103, t. iii., f. 40) could unquestionably be referred to *C. angustatum*, and therefore Gutwinski, by referring a form of *C. angustatum* to

Euastrum Pokornyanum, unconsciously confirms the view that the two species are identical.

As *E. Pokornyanum* was described four years previous to *E. binale* var. *angustatum*, the specific name '*Pokornyanum*' must take precedence.

361. **Cosmarium cymatopleurum** Nordst. 1872.

MID W.—Penyghent, extremely rare along with *Staurastrum acarides*, *Cosmarium Etchachanense*, *C. speciosum*, *C. anceps*, etc.

Var. **tyrolicum** Nordst., 1876.

[Syn. *C. subochthodes* Schmidle, 1895, pro parte.].

MID W.—Shipley Glen, forming pure gelatinous masses on wet shaly rocks. Penyghent.

N.W.—Lund's Fell.

Var. **Archerii** (Roy & Biss.) Nob.

[Syn. *C. Archerii* Roy & Biss, 1893].

MID W.—Penyghent.

Length, 91 μ; breadth, 67 μ; breadth of isthmus, 24 μ.

The drawn-out apices of the semi-cells of this variety give it a rather remarkable character, but this feature is not sufficient to warrant its separation by Messrs. Roy and Bissett as a distinct species. The specimens observed from West Yorkshire were intermediate between the typical form and the var. *Archerii* with regard to the produced apices; they were also intermediate in size, thus proving that these plants are forms of one species.

This species and its varieties are essentially alpine Desmids.

362. **Cosmarium Holmiense** Lund.

S.W.—Ogden Clough.

MID W.—Baildon. Holden Ghyll, near Keighley. Near Ilkley. Cowside Beck, Arncliffe. Moughton Fell. Heseltine Ghyll.

N.W.—Mickle Fell. Lund's Fell. Cowgill Wold Moss, Widdale Fell.

Var. **integrum** Lund.

MID W.—Malham Tarn. Bog two miles south of Clapham. Cowside Beck, Arncliffe. Penyghent.

N.W.—Mossdale Moor, Widdale Fell.

This species is usually found associated with *C. anceps*, *C. speciosum*, etc., amongst wet mosses and algæ on wet rocks.

363. **Cosmarium subundulatum** Wille, 1880.
[Syn. *C. Nuttallii* West].

N.E.—Pilmoor, near Thirsk.

Var. **Beanlandii** West, 1894.

S.E.—Newsholme.

364. **Cosmarium tetragonum** (Näg.) Arch.

MID W.—Near Ilkley ! (Miss J. Town). Penyghent.

N.W.—Mickle Fell.

Var. **Lundellii** Cooke.

MID W.—Cocket Moss, near Giggleswick. Penyghent. Cam Fell.

N.W.—Mickle Fell.

Var. **Davidsonii** (Roy & Biss.) Nob.
[Syn. *C. Davidsonii* Roy & Biss.].

MID W.—Penyghent.

N.W.—Mickle Fell.

365. **Cosmarium notabile** Bréb.

S.W.—Ogden Clough.

MID W.—Ribblehead. Cam Fell.

Forma **minor** Wille.

N.W.—Mickle Fell.

366.—**Cosmarium Subreinschii** Schmidle, in Flora oder allg. Bot. Zeitung, 1894, heft 1, p. 59, t. vii., f. 24.

This is a small species of somewhat characteristic form, approaching *C. impressulum* Elfv. in outline, but with less marked lobulations and more truncate apex, not to mention the prominent, almost peg-like, protuberance on each side of the vertical view. We have not yet seen it from England.

Var. **Boldtiana** Schmidle, in Hedwigia, Bd. xxxiii., 1894, p. 90, t. vi., f. 8. [Syn. *C. Meneghinii* Bréb. forma Boldt in Bih. till K. Sv. Vet.-Akad. Handl., bd. 13, afd. III., no. 5, p. 13, t. i., f. 15; *C. Meneghinii*

forma *Boldtii* West in Journ. Roy. Micr. Soc., 1892, p. 726.].

S.W.—Keighley Moor.

N.W.—Bog near Widdale Beck. Snaizeholme Fell.

This variety has not before been recorded for the British Isles. It differs from the typical form in the rather less pronounced undulations of the lateral margins, the faintly incised apex, and the reduced protuberances of the vertical view, the central area of the semi-cells being slightly thickened.

367. **Cosmarium venustum** (Bréb.) Arch., 1861. [Syn. *Euastrum venustum* Bréb., 1856; *Cosmarium cambricum* Cooke & Wille, 1880].

S.W.—Keighley Tarn. Old Cote Moor.

N.W.—Mickle Fell.

S.E.—Riccall and Skipwith Commons. Hornsea Mere.

368. **Cosmarium ovale** Ralfs.

N.W.—Great Shunnor Fell.

N.E.—Strensall.

369. **Cosmarium tetraophthalmum** (Kütz.), Menegh.

S.W.—Ogden Clough.

MID W.—Bramhope (W. B. Turner). Adel Bog. Eldwick. Malham Tarn.

N.W.—Mickle and Cronkley Fells.

N.E.—Thirkleby Park (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common. Cleava Cliffs, north of Selby.

Var. **Lundellii** Wittr.

N.E.—Pilmoor, near Thirsk.

S.E.—Sandholme. Hornsea Mere.

370. **Cosmarium eboracense** West.

MID W.—Baildon. Cowside Beck, Arncliffe. Half-a-mile south of Cray Moss.

N.W.—Cronkley Fell.

N.E.—Staindale.

371. **Cosmarium Botrytis** (Bory) Menegh.

S.W.—Denholme. Frizinghall. Cullingworth. Near Keighley.

MID W.—Markington, with zygospores! (Rev. J. S. Tute). Adel Bog. Roundhay! (W. B. Turner). Baildon. Kildwick. Rombald's Moor. Otley. Ilkley. Staveley Dam, near Knaresborough. Cocket Moss, near Giggleswick. Near Buckden. Penyghent.

N.W.—Sedbergh. Mickle Fell. Great Shunnor Fell. Lund's Fell. Bog near Widdale Beck.

N.E.—Thirkleby Park; Strensall! (W. B. Turner). Pilmoor, near Thirsk (with zygospores). Terrington. Stokesley.

S.E.—Riccall and Skipwith Commons. Newsholme. Loftsome Bridge, near Wressle. Hornsea Mere.

Var. **mediolæve** West, 1892.

[Syn. *C. subochthodes* Schmidle, 1895, pro parte].

MID W.—Near Ingleton.

N.E.—Strensall Common.

372. **Cosmarium ochthodes** Nordst.

[Syn. *C. ochthodes* var. *obtusatum* Gutw.].

S.W.—Rawcliffe Common. Crimsworth Dean. Cullingworth.

MID W.—Baildon. Wigton Moor. Holden Ghyll, near Keighley. Malham Tarn and Bog. Cocket Moss, near Giggleswick. Ingleton. Moughton Fell. Penyghent. Ribblehead. Oughtershaw Moss.

N.W.—Sedbergh and Cautley Spout. Mickle and Cronkley Fells. Great Shunnor Fell. Cotterdale. Lund's Fell (with zygospores).

N.E.—Pilmoor, near Thirsk. Terrington. Stokesley. Scarborough Mere.

This species is widely distributed in upland districts and is not uncommon in the lowlands. The granules are broad, flattened elevations with a somewhat irregularly-circular outline; they vary considerably in the extent of their development, in some being very prominent, causing the cell-margin to appear distinctly crenate, whereas in others they are much more flattened, the cell-margin only appearing slightly undulate.

Length, 83–94 μ; breadth, 62–67 μ; breadth of apex, about 19–25 μ; breadth of isthmus, 17·5–23 μ.

Zygospore globose, furnished with few (about eleven in the periphery) short, very thick spines; apices of spines obtuse or slightly emarginate.

Diam. without spines 60 μ, with spines 76 μ; length of spines 6–7·5 μ.

Var. **subcirculare** Wille, 1880.

MID W.—Baildon. Boston Spa.

Var. **amœbum** West, 1892. [Syn. *C. ochthodes* forma *granulosum* Lütkem, 1893; *C. ochthodes* var. *amœbo-granulosum* Schmidle, 1894; *C. speciosum* Lund. var. *australianum* Nordst. forma Gutw., 1891].

N.W.—Mickle and Cronkley Fells.

This variety is about the same size as the type, but the semi-cells are more trapeziform, possessing broader apices. The outline is but faintly undulate (much less undulate than in the type), and the granules are very broad towards the centre of the semi-cells, of almost inappreciable elevation and sinuous in outline (hence the name, var. *amœbum*).

Length, 87–90 μ; breadth, 60–67 μ; breadth of apex, 25–27 μ; breadth of isthmus, 21 μ; thickness, 40 μ.

373. **Cosmarium didymochondrum** Nordst.

MID W.—Shipley Glen (iv. 1895), abundant on dripping rocks. Ingleton (viii. 1899).

374. **Cosmarium subnotabile** Wille.

MID W.—Near Settle (viii. 1896). Penyghent (iv. 1896).

N.W.—Cautley Spout (ix. 1899).

375. **Cosmarium Rostafinskii** Gutw.

N.W.—Cautley Spout (ix. 1899).

This species has not previously been recorded for the British Isles. We have also seen it from Scotland.

376. **Cosmarium tumens** Nordst.

MID W.—Ingleton, on dripping rocks (viii. 1899).

Length, 49–51 μ; breadth, 30–33 μ; breadth of isthmus, 17–19 μ; thickness, 27 μ.

This rare species has not previously been recorded for the British Isles. It is known from Spitzbergen, Bohemia, and the United States.

377. **Cosmarium speciosum** Lund.

S.W.—Ogden Clough. Crimsworth Dean. Keighley Tarn.

MID W.—Shipley Glen. Holden Ghyll, near Keighley. Near Ilkley. Cowside Beck, Arncliffe. Penyghent.

N.W.—Mickle Fell. Lund's Fell. Cautley Spout.

Var. **biforme** Nordst.

MID W.—Arncliffe, abundant.

Var. **simplex** Nordst.

MID W.—Penyghent.

N.W.—Mickle Fell. Cowgill Wold Moss, Widdale Fell.

—— —— forma **intermedia** Wille.

S.W.—Woolley.

This species and its varieties are not unfrequent on wet rocks amongst *C. Holmiense*, *C. amceps*, *Penium cucurbitinum*, etc.

378. **Cosmarium subspeciosum** Nordst.

MID W.—Shipley Glen. Penyghent.

N.W.—Mickle Fell.

N.E.—Scarborough Mere.

379. **Cosmarium speciosissimum** Schmidle.

N.W.—Mickle Fell.

This alpine species was described by Schmidle in Oesterr. Botan. Zeitschrift, Jahrg. 1895, p. 24 (Sep.), t. xv., f. 30, 31. It is more profoundly crenate than *C. speciosum* or *C. subspeciosum* and the crenations are slightly emarginate; moreover, the row of marks across the base of the semi-cells is distinctive.

Length, 55 μ; breadth, 36·5 μ; breadth of isthmus, 17·5 μ; thickness, 24 μ.

It has not previously been recorded for the British Isles.

380. **Cosmarium hexalobum** Nordst.

N.W.—Mickle Fell.

381. **Cosmarium nasutum** Nordst.

MID W.—Bog, two miles south of Clapham.

N.W.—Cowgill Wold Moss, Widdale Fell (with zygospores).

Zygospores globose, with rather few mamilliform protuberances (about nine in the periphery); each protuberance furnished with a short, thick, somewhat uncinate spine. Diameter: zygospores without spines, 34—35 μ; with spines, 45—47 μ.

This is another of the rare alpine species of the genus, and its occurrence in Yorkshire is noteworthy.

382. **Cosmarium alatum** Kirchn.

MID W.—Boston Spa.

N.E.—Pilmoor, near Thirsk.

383. **Cosmarium orbiculatum** Ralfs.

S.W.—Cullingworth.

N.W.—Mickle Fell.

N.E.—Strensall (W. B. Turner).

384. **Cosmarium moniliforme** (Turp.) Ralfs.

MID W.—Ilkley (W. H. Dikes). Penyghent.

N.W.—Leeming. Mickle Fell.

N.E.—Strensall. Pilmoor, near Thirsk.

S.E.—Riccall Common.

Forma **panduriformis** Heimerl.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

385. **Cosmarium subexcavatum** Nob. [Syn. *C. excavatum* Nordst. var. *ellipticum* Wille, öfvers. af K. Vet.-Akad. Förh. 1879, no. 5, p. 47, t. xiii., f. 46; *C. isthmium* West var. *Willei* West, Journ. Linn. Soc., Bot., vol. xxix., 1892, p. 160; *Dysphinctium Willei* Schmidle in Hedwigia, Bd. xxxiii., 1894, p. 94].

This plant differs so considerably from *C. excavatum* Nordst. that it must necessarily be considered as a distinct species. Schmidle evidently arrived at the same conclusion but placed it under the genus *Dysphinctium*. The specific name '*Willei*' could not be utilized, as there is a *C. Willei* Lagerh.

Var. **ordinatum** var. n. [Syn. *Dysphinctium Willei* forma Schmidle, l.c., p. 95, t. vi., f. 2].

A little longer than the typical form; granules small, arranged in definite vertical and horizontal series. Length, 29—37 μ; breadth, 17—21 μ; breadth of isthmus, 11·5—13·5 μ.

MID W.—Ingleton, on dripping limestone rocks (viii. 1899).

In the plants examined there were about six horizontal and eight vertical series of granules on each semicell.

On further consideration we are inclined to regard *C. æquinoctiale* West & G. S. West ('Welw. Afric. Alg.,' Journ. Bot., May, 1897, p. 175, t. 365, f. 11) as *C. subexcavatum* var. *æquinoctiale*.

No form of this species has previously been recorded for the British Isles.

386. **Cosmarium connatum** Bréb.
[Syn. *Calocylindrus connatus* (Bréb.) Kirchn.]

S.W.—Cullingworth.

MID W.—Ilkley (W. H. Dikes).

387. **Cosmarium pseudoconnatum** Nordst.
[Syn. *Calocylindrus pseudoconnatus* (Nordst.) Wolle].

N.W.—Mickle Fell.

388. **Cosmarium globosum** Buln., 1861. [Syn. *Calocylindrus strangulatus* Cooke & Wills, 1887].

N.W.—Mickle Fell.

N.E.—Peat deposit, Filey.

389. **Cosmarium pseudarctoum** Nordst.
[Syn. *Calocylindrus pseudarctous* (Nordst.) Cooke].

S.W.—Ogden Clough.

MID W.—Rombald's Moor, abundant along with *Closterium subulatum* in washings of *Potamogeton polygonifolius* and *Bulbochæte setigera*.

N.W.—Cautley Spout.

N.E.—Carlton Bank.

390. **Cosmarium pericymatium** Nordst. 'Desm. arctoæ,' öfvers. af K. Vet.-Akad. Förh., 1875, no. 6, p. 29, t. vii., f. 26.

Var. **eboracense** var. n.

Smaller than the typical form; semicells with fewer and more prominent undulations; membrane punctate. Length, 21 μ; breadth, 14 μ; breadth of isthmus, 10 μ; thickness, 12 μ.

N.W.—Cautley Spout.

This rare alpine species has not been previously recorded for the British Isles.

391. **Cosmarium conspersum** Ralfs.

MID W.—Malham Tarn.

N.W.—Mickle Fell. Great Shunnor Fell.

Var. **rotundatum** Wittr.

S.E.—Skipwith Common; a form with the sides slightly diverging.

392. **Cosmarium quadrum** Lund.

S.W.—Cullingworth.

393. **Cosmarium latum** Bréb.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk. Carlton Bank.

Forma **minor** Boldt, 1888.

[Syn. *C. latum* var. *minor* Roy & Biss., 1894].

S.W.—Ogden Clough.

MID W.—Boston Spa.

394. **Cosmarium biretum** Bréb.

S.W.—Cullingworth.

MID W.—Roundhay Park, Leeds.

Var. **trigibberum** Nordst.

MID W.—Roundhay Park, Leeds.

395. **Cosmarium Broomei** Thwaites.

S.W.—Cullingworth.

MID W.—Wigton Moor. Baildon. Adel Bog. Moughton Fell.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

396. **Cosmarium amœnum** Bréb.

MID W.—Cocket Moss, near Giggleswick.

N.E.—Strensall! (W. B. Turner).

S.E.—Skipwith Common! (Rev. W. Fowler).

397. **Cosmarium pseudamœnum** Wille, 1884.

[Syn. *C. inornatum* Josh., 1886].

S.E.—Skipwith Common.

398. **Cosmarium lepidum** West.

N.W.—Mickle Fell.

399. **Cosmarium Novæ-Semliæ** Wille.

MID W.—Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

400. **Cosmarium Regnesii** Reinsch.

S.E.—Riccall Common.

Var. **montanum** Schmidle, 1895 (April). [Syn. *C. Pseudo-regnesii* West & G. S. West, 1895 (Oct.); *C. montanum* Schmidle, 1896; *C. Novæ Semliæ* Wille var. *polonicum* Eichl. & Gutw., 1894].

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

For an exhaustive account of the forms of this species see G. S. West in Journ. Linn. Soc., Bot. vol. xxvii., 1899, pp. 387–389, t. 10, f. 10–21.

401. **Cosmarium crenatum** Ralfs.

S.W.—Rawcliffe (H. F. Parsons). Crimsworth Dean. Ogden Clough. Cullingworth.

MID W.—Adel. Baildon. Rombald's Moor. Kildwick. Near Ilkley. Harrogate (J. M. Kirk). Malham Tarn. Arncliffe. Cocket Moss, near Giggleswick. Moughton Fell. Penyghent. Cam Fell.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Great Shunnor Fell. Cowgill Wold Moss, Widdale Fell, with zygospores in abundance (iv. 1898).

N.E.—Gormire. Strensall! (W. B. Turner). Peat deposit, Filey.

402. **Cosmarium Grantii** Roy & Biss.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

403. **Cosmarium DeBaryi** Arch.

[Syn. *Calocylindrus DeBaryi* (Arch.) Wolle].

MID W.—Adel Bog.

N.E.—Pilmoor, near Thirsk. Peat deposit, Filey.

404. **Cosmarium subquadratum** Nordst.

MID W.—Ingleton, on wet rocks.

This rare species has not previously been recorded for the British Isles; it was first described from the Tyrol

405. **Cosmarium quadratum** Ralfs.

S.W.—Ogden Clough. Cullingworth.

MID W.—Eldwick. Adel Bog. Ilkley. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Penyghent.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Carlton Bank. Stokesley.

S.E.—Riccall Common. Newsholme.

406. **Cosmarium plicatum** Reinsch.

MID W.—Blubberhouses (W. B. Turner). Adel Bog.

N.W.—Mickle Fell. Great Shunnor Fell.

407. **Cosmarium sinuosum** Lund var. **decedens** (Reinsch) Nordst.

MID W.—Baildon Moor.

408. **Cosmarium sublobatum** (Bréb.) Arch.

S.W.—Ogden Clough.

MID W.—Penyghent. Oughtershaw Tarn.

N.W.—Cautley Spout.

409. **Cosmarium anceps** Lund.

S.W.—Ogden Clough.

MID W.—Baildon. Holden Ghyll, near Keighley. Penyghent.

N.W.—Mickle and Cronkley Fells. Cowgill Wold Moss, Widdale Fell.

This species is generally found on the dripping sandstone and grit rocks in the glens. In the N. Western Fells it is also found in springs on the grit above the limestone.

410. **Cosmarium pseudoexiguum** Racib.

N.E.—Strensall Common: a form somewhat attenuated towards the apices of the semicells. Length, 18 μ; breadth, 7·7 μ; thickness, 4·8 μ.

This species has not previously been recorded for the British Isles.

411. **Cosmarium obliquum** Nordst.

S.W.—Cullingworth.

MID W.—Malham Tarn Bog. Penyghent. Oughtershaw Tarn (forma *major* Nordst.).

N.W.—Mickle Fell. Birkdale Tarn Moss. Lund's Fell. Widdale Fell (2,000 ft.). Snaizeholme Beck. Cowgill Wold Moss, Widdale Fell.

N.E.—Peat deposit, Filey.

412. **Cosmarium rectangulare** Grun. 1868.

[Syn. *C. gotlandicum* Wittr. 1872].

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common! (Rev. W. Fowler).

413. **Cosmarium minimum** West & G. S. West.

N.E.—Pilmoor, near Thirsk.

Not previously recorded for the British Isles.

414. **Cosmarium succisum** West.

MID W.—Wigton Moor.

S.E.—Riccall and Skipwith Commons.

415. **Cosmarium Heimerlii** West & G. S. West.

[Syn. *C. minutissimum* Heimerl non Arch.].

Var. **tumidum** West & G. S. West.

A variety with the angles a little rounder; with an inflation on each side of the vertical view. Length, 9-10 μ; breadth, 10-11·5 μ; breadth of isthmus, 2·5-3 μ; thickness, 5·5 μ.

S.W.—Greetland, near Halifax.

MID W.—Ingleborough. Ribblehead.

N.W.—Lund's Fell. Cowgill Wold Moss, Widdale Fell.

416. **Cosmarium Sphagnicolum** West & G. S. West.

Very minute, a little broader than long, moderately constricted,

with a short and open sinus; semicells subtrapeziform, with the superior angles obliquely truncate, with the sides diverging upwards, apices broad, straight or very slightly retuse; from the side view subcircular; vertical view elliptic-oblong, with somewhat acute poles, slightly tumid on each side in the middle, on each side towards the poles furnished with a small papilla; pyrenoids single. Length, 10·5-11·5 μ; breadth, 11-13·5 μ; breadth of isthmus, 5-5·5 μ; thickness, 6·5 μ.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle Fell. Mossdale Moor, Widdale Fell.

This minute species occurs occasionally in immense quantity amongst *Sphagnum* in small, peaty pools. It is most nearly related to *C. Heimerlii* var. *tumidum* in vertical view, but the front view is quite distinct; it may also be compared with *C. Regnesii* var. *montanum* Schmidle.

417. **Cosmarium truncatellum** (Perty) Rabenh.

N.E.—Strensall (W. B. Turner).

418. **Cosmarium abruptum** Lund.

N.W.—Mickle Fell, very scarce.

419. **Cosmarium abbreviatum** Racib.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

Forma **minor.**

S.E.—Skipwith Common. Only half the size of the type; length, 8 μ; breadth, 9 μ.

420. **Cosmarium pygmæum** Arch.

N.W.—Mickle Fell.

421. **Cosmarium impressulum** Elfv. [Syn. *C. crenulatum* (Ehrenb.) Bréb. var. *Reinschii* Schmidle 1893; *C. Meneghinii* Bréb. f. *Reinschii* Istv. 1887].

MID W.—Malham Tarn.

N.E.—Pilmoor, near Thirsk.

S.E.—Hornsea Mere.

422. **Cosmarium umbilicatum** Lütkem.

N.E.—Malton (viii. 1899).

423. **Cosmarium Regnellii** Wille.

N.E.—Pilmoor, near Thirsk.

424. **Cosmarium Meneghinii** Bréb.

S.W.—Doncaster. Ogden Clough. Cullingworth.

MID W.—Blubberhouses (W. B. Turner). Boston Spa. Malham Tarn. Penyghent. Arthington. Markington, with zygospores! (Rev. J. S. Tute). Adel Bog. Baildon. Rombald's Moor.

N.W.—Mickle and Cronkley Fells. Jervaulx Abbey.

N.E.—Gormire; Strensall (W. B. Turner). Pilmoor, near Thirsk. Saltburn.

S.E.—Riccall Common. Skipwith Common! (Rev. W. Fowler). Newsholme. Hornsea Mere.

Forma **octangularis** Wille.

S.W.—Denholme.

MID W.—Adel. Rombald's Moor. Ben Rhydding. Brearton, near Knaresborough. Malham Tarn.

N.W.—Jervaulx Abbey.

N.E.—Terrington. Malton.

S.E.—Riccall Common. Newsholme. Hornsea Mere.

Var. **Wollei** Lagerh.

S.E.—Riccall Common.

425. **Cosmarium angulosum** Bréb.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

426. **Cosmarium difficile** Lütkem.

S.W.—Cullingworth.

MID W.—Adel Bog.

N.W.—Mickle Fell.

N.E.—Carlton Bank. Stokesley.

Var. **sublæve** Lütkem.

S.W.—Cullingworth.

MID W.—Cocket Moss, near Giggleswick.

N.E.—Strensall Common. Pilmoor, near Thirsk.

S.E.—Skipwith Common.

427. **Cosmarium læve** Rabenh.

MID W.—Boston Spa. Cocket Moss, near Giggleswick. Bog two miles south of Clapham. Ingleton. Ribblehead.

N.W.—Mossdale Moor, Widdale Fell.

Var. **septentrionale** Wille.

S.W.—Ogden Clough. Crimsworth Dean.

N.W.—Mickle and Cronkley Fells. Cotterdale.

N.E.—Scarborough Mere.

428. **Cosmarium elegantissimum** Lund.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

429. **Cosmarium Thwaitesii** Ralfs.

[Syn. *Calocylindrus Thwaitesii* (Ralfs) Schaarschm.]

S.W.—Thornton Moor. Frizinghall. Cullingworth.

MID W.—Adel Bog. Baildon. Rombald's Moor. Penyghent. Whernside.

N.W.—Mickle and Cronckley Fells. Bog near Widdale Beck.

N.E.—Strensall.

430. **Cosmarium Cucurbita** Bréb.

[Syn. *Calocylindrus cucurbita* (Bréb.) Kirchn.].

S.W.—Cragg Vale, towards Blackstone Edge. Cullingworth. Doncaster. Keighley Tarn. Thornton Moor.

MID W.—Rombald's Moor. Black Hill, near Settle. Malham Tarn Bog. Ingleborough. Penyghent. Old Cote Moor. Oughtershaw Tarn. Cam Fell. Whernside (with zygospores).

N.W.—Baugh Fell. Mickle and Cronkley Fells. Great Shunnor Fell. Birkdale Tarn Moss. Lund's Fell (at 2,000 ft.). Mossdale Moor, Widdale Fell. Bog near Widdale Beck. Hunter's Hole, Craydale Moor (1,900 ft.). Cowgill Wold Moss, Widdale Fell.

N.E.—Carlton Bank. Scarborough Mere. Strensall! (W. B. Turner). Pilmoor, near Thirsk.

431. **Cosmarium Palangula** Bréb.

MID W.—Cocket Moss, near Giggleswick. Cowside Beck, Arncliffe. Old Cote Moor.

N.E.—Peat deposit, Filey.

432. **Cosmarium parvulum** Bréb. [Syn. *C. obcuneatum* West 1892, and *C. obcuneatum* forma West 1892.]

N.E.—Pilmoor, near Thirsk. Carlton Bank.

Var. **pumilum** West & G. S. West. [Syn. *C. tetragonum* var. *pumilum* West 1894; *C. parvulum* var. *undulatum* Schmidle 1895; cfr. Journ. Bot., Sept. 1898.]

MID W.—Near Ilkley.

433. **Cosmarium tuberculatum** Arch.
[Syn. *Calocylindrus tuberculatus* (Arch.) Cooke].

N.W.——Mickle Fell: extremely rare.

434. **Cosmarium attenuatum** Bréb.
[Syn. *Calocylindrus attenuatus* (Bréb). Racib.].

MID W.—Arncliffe.

N.W.—Mickle Fell. Cowgill Wold Moss, Widdale Fell.

GENUS COSMOCLADIUM Bréb. 1856.

435. **Cosmocladium constrictum** Arch. 1875.

N.E.—Pilmoor, near Thirsk (vi. 1898).

GENUS SPONDYLOSIUM Bréb. 1844.

436. **Spondylosium pulchellum** Arch.

MID W.—Adel (W. B. Turner).

N.E.—Strensall (W. B. Turner).

S.E.—Riccall and Skipwith Commons.

Var. **pyramidatum** West.

S.E.—Riccall Common.

437. **Spondylosium secedens** (DeBary) Arch.
[Syn. *Sphærozosma secedens* DeBary].

MID W.—Bog two miles south of Clapham (vi. 98).

438. **Spondylosium pygmæum** (Cooke) West 1892.
[Syn. *Sphærozosma pygmæum* Cooke 1886].

This is not *Sphærozosma pygmæum* Rabenh. 1868 = *Cosmarium pygmæum* Arch. 1864.

N.W.—Mickle Fell.

S.E.—Riccall Common.

439. **Spondylosium papillosum** West & G. S. West 1895. [Syn. *Spondylosium dcpressum* Kirchner, Mikr. Pflanz. d Süssw., Theil I, 1891, p. 21, t. ii., f. 61].

This is not *Spondylosium depressum* Bréb. in Kütz. Spec. Algar. p. 189; Mém. Sci. Nat. Cherbourg, IV., t. i., f. 1, 1856.

S.E.—Skipwith Common.

GENUS STAURASTRUM Meyen 1829.

440. **Staurastrum aristiferum** Relfs.

N.W.—Mickle Fell.

441. **Staurastrum connatum** (Lund) Roy & Biss.
[Syn. *S. dejectum* var. *connatum* Lund].

N.E.—Strensall (W. B. Turner).

S.E.—Riccall Common.

442. **Staurastrum dejectum** Bréb.

S.W.—Cullingworth.

MID W.—Bramhope (J. Abbott). Malham Tarn. Ribblehead.

N.W.—Mickle Fell.

N.E.—Scarborough Mere. Strensall; Gormire (W.B.Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

Forma **punctata** West.

MID W.—Adel Bog.

443. **Staurastrum apiculatum** Bréb.
[Syn. *S. dejectum* var. *apiculatum* (Bréb.) Lund].

S.W.—Cullingworth.

MID W.—Adel Bog. Ingleborough.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

444. **Staurastrum mucronatum** Ralfs.
[Syn. *S. dejectum* var. *mucronatum* Ralfs].

S.W.—Cullingworth.

MID W.—Black Hill, near Settle.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

445. **Staurastrum megacanthum** Lund.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

446. **Staurastrum Dickiei** Ralfs.

S.W.—Cullingworth.

MID W.—Black Hill, near Settle. Wigton Moor. Adel. Bride Cross, above Farnley Moor. Ribblehead. Cam Fell.

N.W.—Lund's Fell. Cowgill Wold Moss, Widdale Fell.

N.E.—Strensall. Carlton Bank.

S.E.—Riccall Common.

447. **Staurastrum glabrum** (Ehrenb.) Ralfs.

MID W.—Cam Fell, abundant (viii. 1896). Bog two miles south of Clapham (iv. 1898).

N.W.—Mickle Fell.

448. **Staurastrum brevispinum** Bréb.

MID W.—Malham Tarn.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

449. **Staurastrum cuspidatum** Bréb.

S.W.—Cullingworth.

MID W.—Ilkley (W. H. Dikes).

N.W.—Mickle Fell.

N.E.—Gormire (W. B. Turner).

S.E.—Riccall Common.

Var. **divergens** Nordst.

MID W.—Whernside.

Var. **maximum** West.

MID W.—Malham Tarn.

450. **Staurastrum O'Mearii** Arch.

MID W.—Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

451. **Staurastrum lunatum** Ralfs.

MID W.—Malham Tarn.

N.E.—Scarborough Mere.

S.E.—Riccall Common.

452. **Staurastrum subcruciatum** Cooke & Wills.

MID W.—Wigton Moor.

453. **Staurastrum Avicula** Bréb.

MID W.—Malham Tarn. Penyghent.

N.W.—Mickle Fell. Birkdale Tarn Moss.

N.E.—Strensall (W. B. Turner). Stokesley.

S.E.—Riccall Common.

Var. **subarcuatum** (Wolle) West. [Syn. *S. subarcuatum* Wolle 1880; *S. denticulatum* Elfv. 1881; *S. Avicula* var. *verrucosum* West 1892].

N.W.—Mossdale Moor, Widdale Fell.

N.E.—Stokesley.

454. **Staurastrum aciculiferum** (West) Anders. [Syn. *S. Avicula* var. *aciculiferum* West].

Mid W.—Cocket Moss, near Giggleswick. Penyghent. Whernside.

N.W.—Mickle Fell. Lund's Fell. Mossdale Moor, Widdale Fell.

455. **Staurastrum monticulosum** Bréb.

N.W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

456. **Staurastrum furcatum** (Ehrenb.) Bréb. [Syn. *S. spinosum* Ralfs.; *S. De Tonii* Eichl. & Gutw.; *S. cornubiense* Benn.].

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

457. **Staurastrum furcigerum** Bréb.

Mid W.—Bramhope (J. Abbott).

N.E.—Gormire. Strensall (W. B. Turner). Pilmoor, near Thirsk (with zygospores).

Forma **armigera** Nordst.

[Syn. *S. armigerum* Bréb.; *S. pseudofurcigerum* Reinsch].

N.E.—Gormire (W. B. Turner).

458. **Staurastrum oligacanthum** Bréb.

N.W.—Mickle Fell.

459. **Staurastrum cristatum** (Näg.) Arch. [Syn. *S. Nordstedtii* Gutw.]

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

460. **Staurastrum Reinschii** Roy.

Mid W.—Malham Tarn. Cocket Moss, near Giggleswick. Ingleborough. Cam Fell.

N.W.—Mickle Fell. Lund's Fell. Mossdale Moor, Widdale Fell.

461. **Staurastrum teliferum** Ralfs.

[Syn. *S. polytrichum* Perty var. *alpinum* Schmidle].

S.W.—Cullingworth.

MID W.—Adel Dam (W. B. Turner). Wigton Moor.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

462. **Staurastrum gladiosum** Turn.

Var. **delicatulum** var. n.

A variety with more delicate spines, spines sometimes slightly curved and fewer away from the angles. Length without spines 38 μ, with spines, 45 μ; breadth without spines 39 μ, with spines 49 μ; breadth of isthmus 14 μ.

MID W.—Malham Tarn.

The form of the cells and the number and length of the spines are nearer those of *S. gladiosum* than any other species. The semicells are more depressed than in *S. teliferum* and the spines are longer and more delicate.

463. **Staurastrum polytrichum** Perty.

[Syn. *S. Pringsheimii* Reinsch].

MID W.—Cocket Moss, near Giggleswick. Cautley Spout.

N.E.—Strensall (W. B. Turner).

464. **Staurastrum Saxonicum** Buln.

[Syn. ? *S. bullosum* Benn.].

S.W.—Denholme.

MID W.—Near Buckden. Cam Fell.

465. **Staurastrum pilosum** (Näg.) Arch.

S.W.—Cullingworth.

MID W.—Adel Dam! (W. B. Turner). Adel Bog. Malham Tarn. Bog two miles south of Clapham.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Hunter's Hole, Craydale Moor (1,900 ft.).

N.E.—Strensall (W. B. Turner). Carlton Bank.

466. **Staurastrum Strensallense** Turn.

N.E.—Strensall Common (W. B. Turner).

467. **Staurastrum hirsutum** (Ehrenb.) Bréb.

S.W.—Denholme. Cullingworth.

MID. W.—Adel. Bride Cross, above Farnley Moor. Bog two miles south of Clapham. Ingleborough. South of Cray Moss. Oughtershaw Tarn. Ribblehead.

N.W.—Mickle Fell. Great Shunnor Fell. Lund's Fell. Mossdale Moor, Widdale Fell.

N.E.—Strensall! (W. B. Turner). Scarborough Mere.

468. **Staurastrum paxilliferum** G. S. West.

N.E.—Pilmoor, near Thirsk, abundant (vii. 1898).

This species is only known elsewhere from Wicken Fen, Cambridgeshire.

469. **Staurastrum muticum** Bréb.

Mid W.—Roundhay Park, Leeds, abundant (vi. 1898). Ilkley (W. H. Dikes).

N.W.—Cronkley Fell.

N.E.—Strensall.

S.E.—Riccall Common.

470. **Staurastrum orbiculare** (Ehrenb.) Ralfs.

S.W.—Near Wilsden. Cullingworth.

Mid W.—Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

N.E.—Gormire; Strensall! (W. B. Turner).

S.E.—Riccall Common.

Var. **extensum** Nordst.

S.W.—Ogden Clough.

Mid W.—Arncliffe (with zygospores). Cocket Moss, near Giggleswick.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Bog near Widdale Beck.

Var. **depressum** Roy & Biss.

Mid W.—Malham Tarn. Bog two miles south of Clapham.

N.E.—Pilmoor, near Thirsk. Strensall.

S.E.—Riccall and Skipwith Commons.

471. **Staurastrum suborbiculare** West & G. S. West.

Mid W.—Cam Fell, abundant in a gelatinous mass of *Cylindrocystis crassa*, *Hyalotheca dissiliens*, etc.

472. **Staurastrum Bieneanum** Rabenh.

N.E.—Pilmoor, near Thirsk.

473. **Staurastrum dilatatum** Ehrenb.

S.W.—Cullingworth.

Mid W.—Roundhay Park, Leeds. Ben Rhydding.

N.E.—Strensall Common. Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

Var. **obtusilobum** DeNot.

Mid W.—Near Knaresborough.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

474. **Staurastrum alternans** Bréb.

Mid W.—Blubberhouses (W. B. Turner). Cocket Moss, near Giggleswick.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common. Market Weighton.

475. **Staurastrum punctulatum** Bréb.

S.W.—Cragg Vale, towards Blackstone Edge. Rawcliffe Common. Crimsworth Dean. Halifax. Oxenhope. Allerton. Heaton. Frizinghall. Cullingworth. Keighley (with zygospores).

Mid W.—Roundhay! (W. B. Turner). Adel Bog. Near Norwood Hall, above Lindley Wood Reservoir. Arthington. Rombald's Moor. Ilkley. Bolton Woods. Kildwick. Malham Tarn. Giggleswick Common. Black Hill, near Settle. Penyghent. Baildon.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Great Shunnor Fell. Bog near Widdale Beck.

N.E.—Strensall! (W. B. Turner). Carlton Bank. Near Scarborough.

476. **Staurastrum pygmæum** Bréb.

S.W.—Cullingworth. Near Keighley. Ogden Clough. Swill Hill. Near Hainworth! (T. Hebden).

MID W.—Markington! (Rev. J. S. Tute). Ingleborough. Penyghent. Near Buckden.

N.W.—Cautley Spout (with zygospores). Cronkley Fell. Great Shunnor Fell.

N.E.—Strensall. Pilmoor, near Thirsk.

Zygospore globose, mamillate; each conical elevation furnished with a long spine; apices of spines twice furcate (subdichotomous). Diameter of zygospore without spines 36–39 μ, with spines 64–67 μ.

We have had zygospores of this species from Leça in Portugal (cfr. 'Alg. Aq. Dulc. Lusitan,' Notarisia, vol. vii., 1892, p. 1503) and they agreed exactly with those from Yorkshire. We must, therefore, consider the zygospore figured in Ralfs' Brit. Desm. t. xxxv., f. 26 *c* as immature with regard to its spines.

The specimens obtained from Cautley Spout (with zygospores) were rather more depressed than usual and the lines of granulation were a little further apart.

477. **Staurastrum Kjellmanii** Wille.

N.W.—Mickle Fell.

Var. **rotundum** West & G. S. West.

S.W.—Ogden Clough.

Length 43 μ; breadth 25–26·5 μ; breadth of isthmus 13·5 μ.

478. **Staurastrum turgescens** DeNot.

S.W.—Crimsworth Dean.

Var. **arcticum** Wille.

S.W.—Ogden Clough.

479. **Staurastrum muricatum** Bréb.

S.W.—Ogden Clough. Near Wilsden. Nab Wood, near Bingley. Keighley Moor.

MID W.—Adel Bog. Rombald's Moor. Bog two miles south of Clapham. Near Buckden. Whernside.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Bog near Widdale Beck. Muker. Cowgill Wold Moss, Widdale Fell.

N.E.—Carlton Bank. Stokesley. Near Scarborough.

480. **Staurastrum pyramidatum** West. [Syn. *S. muricatum* Bréb. var. West in Journ. Bot., Oct., 1889; *S. muricatum* var. *acutum* West].

MID W.—Cocket Moss, near Giggleswick. Penyghent.

N.W.—Cautley Spout. Mickle and Cronkley Fells.

481. **Staurastrum Arnellii** Boldt.

N.W.—Mossdale Moor, Widdale Fell.

This rare species was described by Boldt in Öfvers. af. K. Vet.-Akad. Forh. 1885, no. 2, p. 112, t. v., f. 21. Roy describes a variety of it as extremely rare in Scotland, but the typical plant has only previously been recorded for Siberia. We have recently obtained it in abundance from Y Foel Fras, N. Wales.

Length 36·5–38·5 μ; breadth 34·5–37 μ; breadth of isthmus 9–12·5 μ.

482. **Staurastrum spongiosum** Bréb.

N.W.—Mickle Fell.

483. **Staurastrum Meriani** Reinsch., 1867 [Syn. *S. hexagonum* Racib., 1885].

MID W.—Blubberhouses (W. B. Turner). Baildon. Ingleton. Penyghent.

N.W.—Mickle Fell. Cowgill Wold Moss, Widdale Fell.

484. **Staurastrum tumidum** Bréb.

MID W.—Ilkley (W. H. Dikes).

485. **Staurastrum Cosmarioides** Nordst.

MID W.—Blubberhouses (W. B. Turner).

486. **Staurastrum brachiatum** Ralfs.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

487. **Staurastrum læve** Ralfs.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk, abundant (vi. 1898, with zygospores).

Zygospores globose, furnished with spines which are very slightly enlarged at the base and doubly bifid at the apex. Diameter of zygospore without spines 20 μ, with spines 33–35 μ.

488. **Staurastrum irregulare** West.

N.E.—Pilmoor, near Thirsk (vii. 1897).

489. **Staurastrum tetracerum** Ralfs.

MID W.—Roundhay Park, Leeds. Cocket Moss, near Giggleswick.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

490. **Staurastrum hexacerum** (Ehrenb.) Wittr., 1872. [Syn. *Desmidium? hexaceros* Ehrenb., 1835; *Staurastrum tricorne* Ralfs, 1848].

S.W.—Denholme. Cullingworth.

MID W.—Adel Bog. Bolton Woods. Malham Tarn. Ribblehead.

N.W.—Mickle Fell. Cotterdale. Lund's Fell. Snaizeholme Fell.

N.E.—Gormire (W. B. Turner). Strensall.

S.E.—Riccall Common.

Var. β Ralfs.

S.W.—Cullingworth.

N.E.—Strensall.

Var. **semicirculare** Wittr.

MID W.—Baildon Moor. Roundhay Park, Leeds.

491. **Staurastrum pseudotetracerum** (Nordst.) West & G. S. West. [Syn. *S. contortum* Delp. var. *pseudotetracerum* Nordst.].

S.E.—Skipwith Common.

492.—**Staurastrum cyrtocerum** Bréb.

N.E.—Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Riccall and Skipwith Commons.

493.—**Staurastrum inflexum** Bréb.

MID W.—Malham Tarn. Bog two miles south of Clapham.

N.W.—Mickle Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Stokesley.

494. **Staurastrum polymorphum** Bréb.

S.W.—Rawcliffe Common. Denholme.

MID W.—Rombald's Moor. Wigton Moor. Malham Tarn. Bog two miles south of Clapham. Ingleborough. Penyghent. South of Cray Moss. Cam Fell.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Birkdale Tarn Moss. Great Sleddale. Keld. Near Moorcock Inn. Mossdale Moor, Widdale Fell. Bog near Widdale Beck.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common.

495. **Staurastrum crenulatum** (Näg.) Delp.

MID W.—Roundhay Park, Leeds.

N.W.—Cautley Spout.

N.E.—Pilmoor, near Thirsk (with 5-rayed forms). Stokesley.

496. **Staurastrum eboracense** Turn.

N.E.—Strensall Common (W. B. Turner).

497. **Staurastrum Heimerlianum** Lütkem.

[Syn. *S. cruciatum* Heimerl.].

MID W.—Cam Fell (viii. 1896).

498.—**Staurastrum gracile** Ralfs.

S.W.—Rawcliffe (H. F. Parsons). Wakefield (W. H. Dikes).

MID W.—Malham Tarn. Bramhope (J. Abbott). Cocket Moss, near Giggleswick. Ingleborough.

N.E.—Gormire; Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common.

Var. **nanum** Wille.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

499.—**Staurastrum paradoxum** Meyen.

MID W.—Blubberhouses (W. B. Turner). Bride Cross, above Farnley Moor. Ribblehead.

N.E.—Strensall ! (W. B. Turner).

S.E.—Riccall Common.

Var. **longipes** Nordst.

N.E.—Strensall.

500. **Staurastrum oxyacanthum** Arch. 1859. [Syn. *S. scorpioideum* Delp. 1877 var. *brevis* Gutw. 1890.]

MID W.—Cocket Moss, near Giggleswick.

S.E.—Riccall Common.

501. **Staurastrum controversum** Bréb.

MID W. Bog two miles south of Clapham.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

502. **Staurastrum aculeatum** (Ehrenb.) Menegh.

N.E.—Strensall (W. B. Turner).

503. **Staurastrum vestitum** Ralfs.

S.E.—Riccall Common.

504. **Staurastrum Pseudosebaldi** Wille.

N.E.—Pilmoor, near Thirsk (vi. 1898).

505. **Staurastrum Sebaldi** Reinsch.

MID W.—Malham Tarn.

N.E.—Gormire; Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

Var. **ornatum** Nordst.

N.E.—Pilmoor, near Thirsk.

506. **Staurastrum Borgeanum** Schmidle.

N.W.—Bog near Widdale Beck.

This species was described and figured by Schmidle in Bihang till K. Sv. Vet.-Akad. Handl. 1898, Bd. 24, afd. iii., no. 8, p. 60, t. iii., f. 7. His figure is, however, a very poor representation of the species. It was only known previously from Lappmark.

Length, 45 μ; breadth, 43–48 μ; breadth of isthmus, 12 μ.

507. **Staurastrum proboscideum** Arch.

MID W.—Cam Fell (viii. 1896).

508. **Staurastrum asperum** Bréb.

N.W.—Mickle Fell. Mossdale Moor, Widdale Fell.

S.E.—Riccall Common.

509. **Staurastrum capitulum** Bréb.

Var. **amœnum** (Hilse) Rabenh. [Syn. *S. amœnum* Hilse].

MID W.—Old Cote Moor. Cam Fell.

N.W.—Bog near Widdale Beck.

We think there can be no question that *S. amœnum* Hilse is referable to *S. capitulum* Bréb. as a variety; it appears to be a more frequent and widely-distributed plant than typical *S. capitulum.*

Varieties of *S. capitulum* are easily distinguished from varieties of *S. pileolatum* by the lateral projection of the superior angles of the semicells, and by the broader, flattened apex; the granulation of the cells is also much coarser.

510. **Staurastrum pileolatum** Bréb.

N.W.—Mickle Fell.

Var. **Brasiliense** (Börg.) Lütkem. [Syn. *S. amœnum* var. *Brasiliense* Börg. in Vidensk. Medd. f. d. naturh. Foren. Kjöbenhavn, 1890, p. 45, t. iv., f. 44; West in Journ. Linn. Soc., Bot. vol. xxx, 1894, p. 179, t. xxiii., f. 9.]

N.W.—Bog near Widdale Beck.

We fully agree with Lütkemüller in regarding *S. amœnum* var. *Brasiliense* as a variety of *S. pileolatum* Bréb., as its characters are in every respect those of the latter species. The ring of verrucations at the base of the semicells is by no means constant in character, and the specimens observed were somewhat intermediate between var. *Brasiliense* Lütkem. and var. *cristatum.* Lütkem. with regard to this feature.

511. **Staurastrum scabrum** Bréb.

N.W.—Lund's Fell (iv. 1898).

512. **Staurastrum acarides** Nordst.

MID W.—Penyghent.

N.W.—Mickle Fell.

This rare species is only known from four other localities in the British Isles, all of which are in Scotland.

Forma **hexagona** West.

N.W.—Mickle Fell.

Var. **eboracense** West.

N.W.—Mickle Fell.

513. **Staurastrum sexcostatum** Bréb.

S.W.—Denholme.

N.W.—Mickle and Cronkley Fells.

Subsp. **productum** West.

MID W.—Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.W.—Cronkley Fell. Bog near Widdale Beck.

N.E.—Pilmoor, near Thirsk.

514. **Staurastrum margaritaceum** (Ehrenb.) Menegh.

Abundant, more especially in the upland districts; the commonest mountain form of this species is a 4-ended one.

S.W.—Rawcliffe Common. Keighley Moor.

MID W.—Adel. Bride Cross, above Farnley Moor. Rombald's Moor. Cocket Moss, near Giggleswick. Bowland Knotts. Ingleborough. Penyghent. Whernside. Old Cote Moor. Near Buckden. Oughtershaw Tarn. Cam Fell. Ribblehead.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Lund's Fell. Mossdale Moor, Widdale Fell. Bog near Widdale Beck. Dodd Fell (at 2,000 feet). Cowgill Wold Moss, Widdale Fell. Baugh Fell. Hunter's Hole, Craydale Moor.

N.E.—Strensall! (W. B. Turner).

515. **Staurastrum Arachne** Ralfs.

N.E.—Strensall (W. B. Turner).

GENUS ARTHRODESMUS Ehrenb., 1838.

516. **Arthrodesmus convergens** Ehrenb.

MID W.—Bramhope (J. Abbott). Ilkley (W. H. Dikes). Wigton Moor. Penyghent.

N.E.—Gormire (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

517. **Arthrodesmus Incus** (Bréb.) Hass.

S.W.—Greetland, near Halifax (with zygospores). Cullingworth. Keighley Moor.

MID W.—Adel Dam (W. B. Turner). Bride Cross, above Farnley Moor. Malham Tarn. Cocket Moss, near Giggleswick. Bog two miles south of Clapham (with zygospores). Penyghent. Near Buckden.

N.W.—Cowgill Wold Moss, Widdale Fell. Mickle Fell. Lunds Fell.

N.E.—Gormire (W. B. Turner). Strensall Common. Pilmoor, near Thirsk. Moorland stream, near Scarborough.

Var. **Ralfsii** (West & G. S. West). [Syn. *A. Ralfsii* West].

S.W.—Cullingworth.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

518. **Arthrodesmus bifidus** Bréb. var. **truncatus** West.

N.E.—Strensall. Pilmoor, near Thirsk.

Length, 10–12 μ; breadth, 10–11·2 μ; breadth of isthmus, 4·5 μ.

519. **Arthrodesmus octocornis** Ehrenb.

[Syn. *Xanthidium octocorne* Ralfs].

MID W.—Bramhope (W. B. Turner). Ilkley (W. H. Dikes). Wigton Moor. Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

GENUS ONYCHONEMA Wall., 1860.

520. **Onychonema filiforme** (Ehrenb.) Roy & Biss. [Syn. *Tessararthra filiformis* Ehrenb.; *Sphærozosma filiformis* (Ehrenb.), Rabenh.].

N.E.—Pilmoor, near Thirsk, abundant.

S.E.—Skipwith Common.

521. **Onychonema Nordstedtianum** Turn.

N.E.—Strensall ! (W. B. Turner).

S.E.—Riccall Common, abundant.

GENUS SPHÆROZOSMA Corda, 1835.

522. **Sphærozosma vertebratum** (Bréb.) Ralfs.

S.W.—Rawcliffe Common (W. B. Turner).

MID W.—Ingleborough.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk, abundant.

S.E.—Riccall Common.

523. **Sphærozosma excavatum** Ralfs.

S.W.—In horse-trough, Hainworth, near Keighley.

MID W.—Adel Bog (W. B. Turner). Near Selby. Bog two miles south of Clapham. Penyghent. Ribblehead.

N.W.—Mickle Fell.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall Common.

524. **Sphærozosma granulatum** Roy & Biss.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common.

GENUS DESMIDIUM Ag., 1824.

525. **Desmidium cylindricum** Grev.

[Syn. *Didymoprium Grevillei* Kütz.].

MID W.—Adel Bog (W. B. Turner).

N.E.—Strensall (W. B. Turner).

526. **Desmidium Swartzii** Ag.

MID W.—Bramhope (J. Abbott). Ilkley. Cocket Moss, near Giggleswick.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

527. **Desmidium aptogonum** Bréb.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk.

Var. **Ehrenbergii** Kütz. [Syn. *Aptogonum diagonum* Delp.].

N.E.—Strensall Common.

Var. **acutius** Nordst.

N.E. - Pilmoor, near Thirsk.

GENUS GYMNOZYGA Ehrenb., 1840.

528. **Gymnozyga moniliformis** Ehrenb., 1840. [Syn. *Desmidium Borreri* Ralfs, 1843; *Didymoprium Borreri* Ralfs, 1845; *Bambusina Brébissonii* Kütz., 1845].

S.W.—Cullingworth.

MID W.—Malham Tarn. Cocket Moss, near Giggleswick. Ingleborough.

N.W.—Mickle Fell. Lund's Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Riccall and Skipwith Commons.

GENUS HYALOTHECA Kütz., 1840.

529. **Hyalotheca dissiliens** (Sm.) Bréb.

S.W.—Greetland, near Halifax. Cullingworth. Keighley Moor.

MID W.—Markington, with zygospores! (Rev. J. S. Tute). Ilkley. Malham Tarn. Cocket Moss, near Giggleswick (with zygospores). Giggleswick Common (with zygospores). Bowland Knotts. Bog two miles south of Clapham. Ingleborough. Cam Fell. Near Buckden.

N.W. — Baugh Fell. Mickle and Cronkley Fells. Great Shunnor Fell. Lund's Fell (with zygospores).

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Terrington, very large forms (with zygospores). Carlton Bank (with zygospores). Stokesley (with zygospores).

S.E.—Riccall Common (with zygospores). Skipwith Common.

Forma **tridentula** Nordst.

N.W.—Cronkley Fell.

Var. **hians** Wolle.

MID W.—Horton-in-Ribblesdale.

N.W.—Cronkley Fell.

530. **Hyalotheca mucosa** (Dillw.) Ehrenb

MID W.—Cocket Moss, near Giggleswick.

N.W.—Cronkley Fell.

N.E. -Decoy Pond, Gormire (W. B. Turner). Strensall (W. B. Turner). Pilmoor, near Thirsk.

ORDER SIPHONEÆ.

FAMILY *VAUCHERIACEÆ.*

GENUS VAUCHERIA DC., 1803.

531. **Vaucheria sessilis** (Vauch.), DC.

S.W.—Ogden Clough.

MID W.—Baildon. Adel Bog (J. Abbott). Whernside.

N.E.—Carlton Bank.

S.E.—Loftsome Bridge, near Wressle. Newsholme. Market Weighton. Near Sutton. Meaux Abbey.

Var. **cæspitosa** (Vauch.), Rabenh.

MID W.—Markington (Rev. J. S. Tute). Arncliffe.

N.W.—Dent ! (H. F. Parsons).

532. **Vaucheria aversa** Hass.

S.E.—Newsholme, near Howden.

533. **Vaucheria sericea** Lyngb.

N.W.—Great Shunnor Fell.

S.E.—Beverley.

534. **Vaucheria geminata** (Vauch.), DC.

S.W.—Bradford.

MID W.—Baildon. Headingley; Harrogate (J. Abbott).

Var. **racemosa** Walz.

MID W.—Meanwood (J. Abbott). Ingleborough.

535. **Vaucheria dichotoma** (L.), Ag. var. **submarina** Ag.

S.W.—Goole.

536. **Vaucheria terrestris** Lyngb.

S.W.—Common about Bradford. Keighley (T. Hebden). Grimescar.

MID W.—Holden Ghyll, near Keighley.

537. **Vaucheria hamata** (Vauch.), Lyngb

S.W.—Calverley, on damp mud.

A variety of this species was observed on wet limestone rocks at Boston Spa. It was smaller than the type with globose oogonia. Thickness of filaments, 25–30 μ.

FAMILY *HYDROGASTRACEÆ.*

GENUS BOTRYDIUM Wallr., 1815.

538. **Botrydium granulatum** (L.), Grev.

S.W.—Calverley (vi. 1893), in great profusion on mud turned out from the canal. Shipley (ix. 1895), on mud turned out from the canal. Near Gilstead, close to the river Aire.

MID W.—Adel Dam, on drying-up mud (J. Abbott); this was many years ago, and it has not been seen there since. Brearton, near Knaresborough.

ORDER PROTOCOCCOIDEÆ.

FAMILY *VOLVOCINEÆ.*

GENUS VOLVOX Ehrenb., 1832.

539. **Volvox globator** (L.), Ehrenb.

S.W.—Still waters, somewhat rare, but fairly general. Hatfield Chase (J. M. Kirk). Askern (Rev. F. H. Allen). Rawcliffe! (T. Hick). Frizinghall. Hunslet Old Race-course (J. Abbott).

MID W.—Markington! (Rev. J. S. Tute). Bramham Park (B. Saynor). Roundhay (R. Duncan). Bramhope; pool by the Ure at Ripon (J. Abbott). Harrogate (J. M. Kirk).

N.E.—Strensall (W. B. Turner).

S.E.—Kirkham Abbey (J. M. Kirk).

540. **Volvox aureus** Ehrenb.

S.W.—Goole; Midgeley Moor; Salterhebble, near Halifax; Thornhill Lees (T. Hick).

MID W.—Askham Bog; near Wetherby (T. Hick).

N.E.—Strensall (T. Hick). Pilmoor, near Thirsk.

GENUS EUDORINA Ehrenb., 1832.

541. **Eudorina elegans** Ehrenb.

S.W.—Frizinghall. Goole.

N.E.—Pilmoor, near Thirsk. Terrington.

S.E.—Skipwith Common.

GENUS GONIUM Müller, 1773.

542. **Gonium pectorale** Müller.

S.W.—Goole (H. F. Parsons). Wortley, near Leeds (W. B. Turner). Cullingworth.

MID W.—Markington ! (Rev. J. S. Tute).

N.W.—Great Shunnor Fell.

N.E.—Strensall ; Gormire (W. B. Turner). Scarborough Mere.

S.E.—Kirkham Abbey (J. M. Kirk). Brackenholme.

GENUS PANDORINA Bory, 1824 ; em Pringsh., 1869.

543. **Pandorina morum** (Müll.), Bory.

S.W.—Goole. Askern. Rawcliffe (H. F. Parsons). Bradford. Frizinghall.

MID W.—Markington ! (Rev. J. S. Tute). Rombald's Moor. Bride Cross, above Farnley Moor. Bramhope; York (J. Abbott).

N.W. Cronkley Fell.

N.E.—Gormire (W. B. Turner). Pilmoor, near Thirsk. Stokesley. Scarborough Mere ! (G. Massee). Saltburn.

S.E. Brackenholme. Market Weighton. Hornsea Mere.

GENUS STEPHANOSPHERA Cohn, 1852.

544. **Stephanosphæra pluvialis** Cohn.

MID W.—Baildon Moor. Only obtained once, from a rain-pool in a hollow of grit-rock.

GENUS CHLAMYDOMONAS Ehrenb., 1833.

545. **Chlamydomonas Pulvisculus** (Müll.), Ehrenb.

S.W.—Frizinghall, abundant in pools (viii. 1896).

N.W.—Cowgill Wold Moss, Widdale Fell. Lund's Fell.

N.E.—Terrington.

546. **Chlamydomonas multifilis** Ehrenb.

S.W.—Near Doncaster. Frizinghall, abundant.

This species has not previously been recorded from the British Isles.

GENUS HÆMATOCOCCUS Ag., 1828.

547. **Hæmatococcus lacustris** (Girod.), Rostaf. [Syn. *Volvox lacustris* Girod. ; *Chlamydococcus pluvialis* (Flot.), A. Br.].

S.W.—More or less general in stagnant rain-water. Wibsey. Manningham. Keighley Moor.

MID W.—Baildon. Leeds (J. Abbott). Harrogate (T. Hick). Boston Spa.

N.W.—Cotterdale.

N.E.—Strensall! (W. B. Turner). Seamer. Scarborough Mere.

S.E.—Beverley.

FAMILY *PALMELLACEÆ*.

SUB-FAMILY CŒNOBIEÆ.

GENUS HYDRODICTYON Roth., 1800.

548. **Hydrodictyon reticulatum** (L.), Lagerh. [Syn. *Conferva reticulata* L.; *Hydrodictyon utriculatum* Roth.].

N.E.—Scarborough Mere! (G. Massee).

GENUS CŒLASTRUM Näg., 1849.

549. **Cœlastrum sphæricum** Näg.

S.W.—Keighley Moor.

MID W.—Penyghent.

N.E.—Pilmoor, near Thirsk. Terrington.

S.E.—Riccall and Skipwith Commons.

550. **Cœlastrum microporum** Näg.

MID W.—Adel. Malham Tarn.

N.E.—Scarborough Mere.

S.E.—Riccall Common.

551. **Cœlastrum pulchrum** Schmidle.

MID W.—Roundhay Park, Leeds. Staveley Dam, near Knaresborough.

N.E.—Pilmoor, near Thirsk.

552. **Cœlastrum cubicum** Näg.

N.E.—Pilmoor, near Thirsk.

553. **Cœlastrum verrucosum** Reinsch.

N.E.—Pilmoor, near Thirsk.

GENUS SORASTRUM Kütz., 1845.

554. **Sorastrum spinulosum** Näg., 1849.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

GENUS PEDIASTRUM Meyen, 1829.

555. **Pediastrum angulosum** (Ehrenb.), Menegh.

S.W.—Wakefield (W. H. Dikes).

MID W.—Malham Tarn. Penyghent. Ribblehead.

N.E.—Scarborough Mere.

556. **Pediastrum Boryanum** (Turp.), Menegh.

S.W.—Doncaster. Rawcliffe. Askern (Rev. F. H. Allen). Manningham. Calverley. Bingley.

MID W.—Markington! (Rev. J. S. Tute). Hawksworth. Wigton Moor. Austwick. Ben Rhydding. Malham Tarn. Langcliffe, near Settle.

N.W.—Mickle Fell.

N.E.—Strensall! (W. B. Turner). Malton. Stokesley. Scarborough Mere.

S.E.—Skipwith Common. Sandholme. Hornsea Mere.

Var. **granulatum** (Kütz.), A. Br.

MID W.—Adel (J. Abbott). Staveley Dam, near Knaresborough.

N.E.—Strensall (W. B. Turner). Pilmoor, near Thirsk.

S.E.—Sandholme. Market Weighton.

557. **Pediastrum glanduliferum** Benn.

N.W.—Near Jervaulx Abbey (vii. 1898).

558. **Pediastrum constrictum** Hass.

S.W.—Frizinghall.

N.E.—Strensall Common. Pilmoor, near Thirsk. Stokesley.

S.E.—Skipwith Common.

559. **Pediastrum duplex** Meyen, 1829.

[Syn. *P. pertusum* Kütz., 1845].

S.W.—Wakefield (W. H. Dikes). Frizinghall.

MID W.—Roundhay Park, Leeds. Malham Tarn Bog.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk. Scarborough Mere.

560. **Pediastrum gracile** Ralfs.

MID W.—Markington ! (Rev. J. S. Tute).

S.E.—Riccall Common.

561. **Pediastrum biradiatum** Meyen, 1829.

[Syn. *P. Rotula* (Ehrenb., 1838) A. Br., 1855].

N.E.—Scarborough Mere ! (G. Massee).

562. **Pediastrum bidentulum** A. Br.

MID W.—Malham Tarn Bog (viii. 1896).

563. **Pediastrum tetras** (Ehrenb.), Ralfs.

[Syn. *P. Ehrenbergii* (Corda), A. Br.].

Forma *a*. Dispositio cellularum 4.

MID W.—Adel. Ribblehead.

N.E.—Near Rievaulx Abbey. Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Riccall Common.

Forma *b*. Dispositio cellularum 1 + 7.

S.W.—Rawcliffe Common (H. F. Parsons).

MID W.—Malham Tarn Bog.

N.E.—Strensall ! (W. B. Turner). Pilmoor, near Thirsk. Terrington. Stokesley. Scarborough Mere.

S.E.—Skipwith Common.

Forma *c*. Dispositio cellularum 4 + 11.

MID W.—Malham Tarn Bog.

564. **Pediastrum integrum** Näg.

MID W.—Staveley Dam, near Knaresborough.

N.E.—Pilmoor, near Thirsk.

GENUS CRUCIGENIA Morren, 1830.

565. **Crucigenia rectangularis** Näg.

[Syn. *Staurogenia rectangularis* (Näg.), A. Br., 1855].

MID W.—Staveley Dam, near Knaresborough.

N.W.—Lund's Fell.

N.E.—Pilmoor, near Thirsk. Malton.

S.E.—Hornsea Mere.

566. **Crucigenia quadrata** Morren, 1830.

MID W.—Langcliffe, near Settle.

GENUS COHNIELLA Schröder, 1897.

567. **Cohniella staurogeniæformis** Schröder.

N.E.—Not uncommon in a pond near Rievaulx Abbey (vii. 1898).

The specimens agreed very well with Schröder's description and figures (Bericht. Deutsch. Botan. Gesellsch. 1897, xv., p. 373, t. xvii., f. 5). Diam. cells without spines 3—5·5 μ; length of spines 2·5—3·8 μ. There were five spines on the exterior margin of each cell.

This plant has not been previously recorded for the British Isles.

SUB-FAMILY PSEUDOCŒNOBIEÆ.

GENUS MISCHOCOCCUS Näg., 1849.

568. **Mischococcus confervicola** Näg.

S.W.—Shipley (ix. 1896).

MID W.—Boston Spa (iv. 1897). Cam Fell (viii. 1896).

N.W.—Cowgill Wold Moss, Widdale Fell (iv. 1897).

N.E.—Pilmoor, near Thirsk (vi. 1898).

SUB-FAMILY RHAPHIDIEÆ.

GENUS DACTYLOCOCCUS Näg., 1849.

569. **Dactylococcus infusionum** Näg.

S.W.—Bradford. Clayton.

MID W.—Harrogate.

N.E.—Near Scarborough.

S.E.—Market Weighton.

570. **Dactylococcus rhaphidioides** Hansg.

S.W.—Bradford.

The cells were mostly fusiform, sigmoid, or sublunate, and were 2–2·5 μ in diameter.

It has not been previously recorded for the British Isles.

571. **Dactylococcus bicaudatus** A. Br.
[Syn. *Characium longipes* Reinsch].

N.W.—Cautley Spout.

Var. **exilis** West & G. S. West.

S.W.—Horton Park, Bradford, forming a mucous, green stratum on wet stones.

MID W.—Langcliffe, near Settle. Ingleton.

N.W.—Cowgill Wold Moss, Widdale Fell.

Var. **subramosum** West & G. S. West.

N.W.—Mossdale Moor, Widdale Fell, forming a green stratum on dripping rocks.

This variety is smaller than the type, and the cells are less attenuated, concatenate and ramose. Diam. cell 3·8—6·5 μ.

GENUS SCENEDESMUS Meyen, 1829.

572. **Scenedesmus antennatus** Bréb.

MID W.—Langcliffe, near Settle.

N.W.—Near Jervaulx Abbey.

N.E.—Pilmoor, near Thirsk. Scarborough Mere.

S.E.—Skipwith Common.

573. **Scenedesmus obliquus** (Turp.) Kütz.
[Syn. *S. acutus* Meyen].

S.W.—Rawcliffe (H. F. Parsons). Heaton.

MID W.—Markington! (Rev. J. S. Tute). Bramhope (J. Abbott). Adel. Arthington. Hawksworth. Wigton Moor. Boston Spa. Malham Tarn. Arncliffe. Moughton Fell.

N.W.—Mickle and Cronkley Fells. Near Jervaulx Abbey.

N.E.—Near Rievaulx Abbey. Strensall! (W. B. Turner). Scarborough Mere. Scalby Beck.

Var. **dimorphus** (Turp.) Rabenh.

S.E.—Skipwith Common.

574. **Scenedesmus bijugatus** (Turp.) Kütz. [Syn. *S. obtusus* Meyen; *S. quadricauda* (Turp.) Bréb. var. *ecornis* (Ehrenb.) Ralfs].

S.W.—Rawcliffe (H. F. Parsons). Bradford. Cullingworth.

MID W.—Bramhope (J. Abbott). Arthington. Langcliffe, near Settle.

N.W.—Mickle Fell. Near Jervaulx Abbey.

N.E.—Pilmoor, near Thirsk. Scarborough Mere. Hayburn Wyke.

575. **Scenedesmus quadricauda** (Turp.) Bréb.

S.W.—Doncaster. Skelmanthorpe. Wibsey. Bradford. Frizinghall.

MID W.—Markington! (Rev. J. S. Tute). Bramhope (J. Abbott). Baildon. Arthington. Boston Spa. Oak Beck, Harrogate. Ilkley. Ben Rhydding. Roundhay Park, Leeds. Malham Tarn. Ribblehead.

N.W.—Mickle Fell. Near Jervaulx Abbey.

N.E.—Near Rievaulx Abbey. Strensall! (W. B. Turner). Terrington. Pilmoor, near Thirsk. Stokesley. Scarborough Mere. Saltburn.

S.E.—Skipwith Common. Loftsome Bridge, near Wressle. Market Weighton. Hornsea Mere.

Var. **abundans** Kirchn.

MID W.—Bolton Woods.

N.E.—Scalby Beck.

576. **Scenedesmus denticulatus** Lagerh.

S.W—Near Bradford.

Var. **linearis** Hansg.

S.W.—Askern.

MID W.—Roundhay Park, Leeds. Boston Spa. Staveley Dam, near Knaresborough. Wigton Moor. Penyghent.

N.E.—Pilmoor, near Thirsk. Terrington. River Derwent, Forge Valley.

S.E.—Skipwith Common. Market Weighton.

577. **Scenedesmus spicatus** West & G. S. West.

N.E.—Saltburn.

Cells generally binate, elliptical, about twice longer than broad, each furnished with a series of six or seven short spines on the exterior margin.

Length of cells 7·5—9 μ; breadth of cells 4 μ; length of spines 2—2·5 μ.

578. **Scenedesmus Hystrix** Lagerh.

S.E.—Skipwith Common.

This species has not previously been recorded for the British Isles.

579. **Scenedesmus acutiformis** Schröder.

MID W.—Staveley Dam, near Knaresborough.

N.E.—Near Rievaulx Abbey. Pilmoor, near Thirsk. Malton.

580. **Scenedesmus costatus** Schmidle.

N.E.—Pilmoor, near Thirsk (vii. 1898).

This species was described by Schmidle (Oesterr. botan. Zeitschrift, 1895, p. 6 (Sep.), t. xiv., f. 5) from the Alps.

It has not previously been recorded for the British Isles.

GENUS RHAPHIDIUM Kütz., 1845.

581. **Rhaphidium polymorphum** Fresen.

Var. **falcatum** (Corda) Rabenh. [Syn. *R. falcatum*].

S.W.—Bradford. Cullingworth. Keighley Moor.

MID W.—Baildon Moor. Chapel-Allerton; Adel (J. Abbott). Wigton Moor. Ilkley (W. J. Dikes). Bolton Woods. Cocket Moss, near Giggleswick. Penyghent. Harrogate. Boston Spa. Staveley Dam, near Knaresborough.

N.W.—Cronkley Fell.

N.E.—Strensall! (W. B. Turner). Near Rievaulx Abbey. Stokesley. Scarborough Mere.

S.E.—Riccall and Skipwith Commons.

Var. **aciculare** (A. Br.) Rabenh. [Syn. *R. aciculare* A. Br.; *Closterium subtile* Bréb.; *Cl. Griffithii* Berk.].

S.W.—Cullingworth! (T. Hebden).

MID W.—Markington! (Rev. J. S. Tute). Baildon Moor. Wigton Moor. Penyghent. Boston Spa. Brearton, near Knaresborough.

N.W.—Masham. Near Jervaulx Abbey. Muker.

N.E.—Scarborough Mere. Scalby Beck. Malton. Stokesley.

S.E.—Skipwith Common.

Var. **duplex** (Kütz.). [Syn. *R. duplex* Kütz.; *R. polymorphum* var. *sigmoideum* Rabenh.].

S.W.—Cullingworth.

Mid W.—Moor-Allerton; Roundhay (W. B. Turner). Baildon.

Var. **spirale** West & G. S. West.

Mid W.—Hawksworth, in immense quantities amongst *Myriophyllum spicatum*. Harrogate.

N.E.—Pilmoor, near Thirsk.

582. **Rhaphidium setigerum** (Schröder) Nob.

[Syn. *Reinschiella ? setigera* Schröder].

N.E.—Near Rievaulx Abbey.

The plants we observed agreed well with the description and figures given by Schröder ('Ueber das Plankton der Oder,' Bericht. Deutsch. Botan. Gesellsch., 1897, Bd. xv., Heft 9, p. 492, t. xxv., f. 4) except that the setæ were a little shorter.

Length with setæ 75—88 μ; without setæ 29—31 μ; breadth 5·7—6·5 μ.

Quite recently Lemmermann has described a plant under the name of *Closteriopsis longissima* which is very closely allied to *R. setigerum* (Cfr. Plöner Forschungsberichten, Teil 7, p. 29, t. ii., f. 36–38). He places it in the Desmidieæ between *Closterium* and *Pleurotænium*, but in this he is quite wrong, as *Closteriopsis* is not a Desmid.

In the same paper Lemmermann places *R. polymorphum* var. *mirabile* West & G. S. West as a distinct species—*R. mirabile* Lemmerm. In this also he is quite wrong, as *R. polymorphum* var. *mirabile* occurred amongst hundreds of specimens of all forms of *R. polymorphum* and therefore could only be described as a peculiar form of it.

Species of *Rhaphidium*, *Scenedesmus*, and *Dactylococcus* very often (many of them as a rule) possess pyrenoids.

Raphidium setigerum has not been previously recorded for the British Isles.

583. **Rhaphidium convolutum** (Corda) Rabenh.

S.W.—Denholme.

MID W.—Arthington. Cowside Beck, Arncliffe.

N.W.—Cautley Spout.

584. **Rhaphidium biplex** Reinsch.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

GENUS SELENASTRUM Reinsch, 1867.

585. **Selenastrum gracile** Reinsch, 1867.

MID W.—Langcliffe, near Settle. Small forms, diam. cell 2—2·3 μ.

586. **Selenastrum acuminatum** Lagerh., 1882.

S.E.—Skipwith Common.

GENUS CHODATELLA Lemmermann, 1898.

587. **Chodatella radians** (West & G. S. West), Lemmermann, 1898. [Syn. *Oocystis ciliata* Lagerh. var. *radians* West & G. S. West, 1896].

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

This plant was first described as a variety of *Oocystis ciliata* in Journ. Roy. Micro. Soc., 1896, p. 161, t. iii., f. 15. Shortly afterwards Chodat (Sur le genre Lagerheimia, Nuova Notarisia, 1895) referred *Oocystis ciliata* to his genus *Lagerheimia*, and finally both *Oocystis ciliata* and the var. *radians* have been referred by Lemmermann (Hedwigia, Bd. xxxvii., 1898) as separate species of the genus *Chodatella*.

GENUS TETRAEDRON Kütz., 1845.

588. **Tetraëdron regulare** Kütz., 1845.

[Syn. *Polyedrium tetraëdricum* Näg., 1849].

MID W.—Wigton Moor. Markington! (Rev. J. S. Tute). Cocket Moss, near Giggleswick.

N.W.—Cowgill Wold Moss, Widdale Fell. Mickle Fell. Dodd Fell.

N.E.—Pilmoor, near Thirsk. Malton.

S.E.—Riccall Common.

589. **Tetraëdron enorme** (Ralfs, 1848) Hansg., 1888. [Syn. *Staurastrum enorme* Ralfs, 1848; *Polyedrium enorme* (Ralfs) De Bary].

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common.

590. **Tetraëdron gigas** (Wittr., 1872), Hansg., 1888. [Syn. *Polyedrium gigas* Wittr., 1872].

N.W.—Birkdale Tarn Moss.

591. **Tetraëdron lobulatum** (Näg., 1849), Hansg., 1888. [Syn. *Polyedrium lobulatum* Näg., 1849].

N.E.—Gormire (W. B. Turner).

592. **Tetraëdron minimum** (A. Br., 1868), Hansg., 1888. [Syn. *Polyedrium minimum* A. Br., 1868; *P. Pinacidium* Reinsch., 1867].

Mid W.—Old Cote Moor. Roundhay Park, Leeds.

N.E.—Pilmoor, near Thirsk.

S.E.—Market Weighton.

593. **Tetraëdron trigonum** (Näg., 1849], Hansg., 1888. [Syn. *Polyedrium trigonum* Näg., 1849].

N.E.—Pilmoor, near Thirsk.

594. **Tetraëdron tetragonum** (Näg., 1849), Hansg., 1888. [Syn. *Polyedrium tetragonum* Näg., 1849].

S.W.—Frizinghall.

N.E.—Pilmoor, near Thirsk. Rievaulx Abbey.

595. **Tetraëdron octaëdricum** (Reinsch., 1867), Hansg. 1888. [Syn. *Polyedrium octaëdricum* Reinsch., 1867].

Mid W.—Cam Fell.

N.W.—Bog near Widdale Beck.

S.E.—Riccall Common.

This species has not previously been recorded for the British Isles.

596. **Tetraëdron caudatum** (Corda), Hansg., 1888. [Syn. *Polyedrium pentagonum* Reinsch].

597. **Tetraëdron incisum** Lagerh.

N.W.—Jervaulx Abbey.

N.E.—Pilmoor, near Thirsk.

598. **Tetraëdron muticum** (A. Br.), Hansg. 1888.

N.E.—Strensall.

599. **Tetraëdron decussatum** (Reinsch, 1867) Nob.

[Syn. *Polyedrium decussatum* Reinsch, 1867].

N.E.—Pilmoor, near Thirsk. There were two forms agreeing with those figured by Reinsch in Abhandl. Naturhistor. Gesellsch. Nürnberg., Bd. 3, p. 79, t. ii., f. iii. and iv. (f. multilobum). Hansgirg, in Hedwigia, 1888, p. 132, includes this species under *T. enorme*, but it is certainly distinct from any forms of *T. enorme* we have yet come across.

Diam., 46–55 μ.

This species has not previously been recorded for the British Isles.

GENUS CERASTERIAS Reinsch, 1867.

600. **Cerasterias longispina** (Perty 1852) Nob.

[Syn. *Polyedrium longispinum* (Perty), Rabenh. 1868].

N.W.—Mickle Fell.

601. **Cerasterias rhaphidioides** Reinsch, 1867.

MID W.—Pond, Boston Spa (iv., 1897).

SUB-FAMILY CHARACIEÆ.

GENUS CHARACIUM A. Br., 1849.

602. **Characium ornithocephalum** A. Br., 1855.

MID W.—Baildon. Boston Spa.

603. **Characium longipes** Rabenh.

N.E.—Pilmoor, near Thirsk.

604. **Characium Sieboldi** A. Br.

S.W.—Keighley (T. Hebden). Bowling.

MID W.—Near Ilkley (Miss J. Town).

605. **Characium minutum** A. Br.

S.W.—Wibsey (vii. 1896).

This species has not previously been recorded for the British Isles.

606. **Characium tenue** Herm.

N.E.—Pilmoor, near Thirsk.

This species has not previously been recorded for the British Isles.

607. **Characium ensiforme** Herm.

Somewhat erect, almost straight, sometimes subarcuate, linear lanceolate, about twenty times longer than the diameter, apex acute, gradually attenuated downwards into a narrow stalk, base slightly dilated; chlorophyll pale-green, somewhat irregular, with few granules, not filling the whole cell.

Thickness, 2·5–3·8 μ; length, 65–86 μ.

This agrees with the description of *C. ensiforme*, but the margin was never 'undulato-tumidula,' and the base was hardly 'nodoso-incrassato.'

N.E.—Pilmoor, near Thirsk, attached to *Œdogonium* sp.

This species has not previously been recorded for the British Isles.

608. **Characium acuminatum** (A. Br.).

[Syn. *Hydrocytium acuminatum* A. Br., 1855].

MID W.—Boston Spa.

N.E.—Gormire (W. B. Turner).

This species has not previously been recorded for the British Isles.

609. **Characium heteromorphum** (Reinsch).

(Syn. *Hydrianum heteromorphum* Reinsch].

S.W.—Near Mirfield. Greetland, near Halifax. Keighley Moor.

MID W.—Malham Tarn. Markington! (Rev. J. S. Tute). Wigton Moor. Boston Spa. Cam Fell.

N.W.—Mickle Fell.

N.E.—Scarborough Mere. Terrington.

S.E.—Newsholme.

610. **Characium** sp.

S.W.—Keighley Moor (cfr. Journ. Bot., 1899, p. 222, t. 395, f. 7).

GENUS STIPITOCOCCUS West & G. S. West.

611. **Stipitococcus urceolatus** W. & G. S. West.

Lat. cell., 3–4·2 μ; altit. 6·5–10·5 μ; long. stip. hyal. 4–6 μ.

MID W.—Oughtershaw Tarn (1,800 feet), epiphytic on *Mougeotia* sp.

N.E.—Pilmoor, near Thirsk (vi. 1898).

This interesting alga occurred in large numbers closely clustered round some filaments of *Mougeotia*; it seems to be allied to the genus *Peroniella* Gobi, which is an epiphyte on filamentous *Desmidieæ* (e.g., *P. hyalothecæ*), but is, however, much smaller and of a different form, the expanded and irregular apex being remarkable. The stalk is extremely hyaline, in fact barely visible, and it is very likely on account of its extreme tenuity that it was originally formed from the single cilium of a zoospore as in *Peroniella*, although it is comparatively much shorter. There was no trace of a lateral crack for the escape of the zoospore, as in *Peroniella*, and it is more probable that the zoospores would escape from the expanded apex of the cells.

The measurements of *Peroniella* in De Toni's Sylloge Algarum appear to be wrong according to Gobi's figures (Scripta Botan., Horti Univer. Imper. Petropolitanæ, tom. 1, 1866-7, pp. 244-250, t. 1).

SUB-FAMILY ENDOSPHÆREÆ.

GENUS CHLOROCHYTRIUM Cohn.

612. **Chlorochytrium Lemnæ** Cohn.

S.W.—On *Lemna trisulca*, Doncaster. On *L. minor*, Bradford.

SUB-FAMILY TETRASPOREÆ.

GENUS SCHIZOCHLAMYS A. Br., 1849.

613. **Schizochlamys gelatinosa** A. Br.

MID W.—Adel Bog. Bingley.

N.E.—Strensall.

S.E.—Very fine in a pond near Meaux Abbey.

614. **Schizochlamys delicatula** West.

MID W.—Bride Cross, above Farnley Moor. Cam Fell.

GENUS PALMODACTYLON Näg., 1849.

615. **Palmodactylon subramosum** Näg.

MID W.—Wigton Moor. Bog two miles south of Clapham. Cocket Moss, near Giggleswick.

N.W.—Great Shunnor Fell. Cronkley Fell.

616. **Palmodactylon simplex** Näg.

N.W.—Bog near Widdale Beck (iv. 1898).

GENUS APIOCYSTIS Näg., 1849.

617. **Apiocystis Brauniana** Näg.

S.W.—Frizinghall.

MID W.—Chapeltown; Adel Bog (Abbott, Emsley, and Turner). Boston Spa. Malham Tarn Bog. Cocket Moss, near Giggleswick.

N.W.—Cowgill Wold Moss, Widdale Fell. Sedbergh.

N.E.—Scarborough Mere. Strensall (W. B. Turner). Pilmoor, near Thirsk. Terrington.

GENUS TETRASPORA Link, 1809.

618. **Tetraspora gelatinosa** (Vauch.) Desv.

MID W.—Gordale (C. B. Crawshaw). Adel Bog (Abbott, Emsley and Turner). Markington! (Rev. J. S. Tute). Trough, Malham.

N.W.—Sedbergh.

N.E.—Levisham.

S.E.—Newsholme, near Howden.

619. **Tetraspora lubrica** (Roth) Ag.

S.W.—Greetland, near Halifax.

N.W.—Great Shunnor Fell.

620. **Tetraspora bullosa** (Roth) Ag.

S.W.—Goole (H. F. Parsons). Askern (Rev. F. H. Allen). Frizinghall.

MID W.—Roundhay (Abbott, Emsley and Turner). Scotland Mill Beck (W. B. Turner).

GENUS PALMELLA Lyngb., 1817; Näg., 1849.

621. **Palmella mucosa** Kütz.

S.W.—Keighley. Doncaster. Goole.

MID W.—Beamsley Beacon.

N.W.—Cronkley Fell. Great Shunnor Fell. Cotterdale.

N.E.—Strensall! (W. B. Turner).

622. **Palmella hyalina** Bréb.

S.W.—Cullingworth (T. Hebden).

MID W.—Garforth (H. F. Parsons).

N.W.—Cotterdale.

N.E.—Strensall (W. B. Turner). Scarborough Mere.

GENUS BOTRYDINA Bréb.

623. **Botrydina vulgaris** Bréb.

MID W.—Harrogate (Abbott, Emsley and Turner). Headingley (W. B. Turner). Penyghent. Ingleborough. Whernside. Bolton Woods. Also in abundance on peat, Simon Seat.

N.W.—Howgill Fells. In profusion amongst *Tetraphis pellucida* and *Leucobryum glaucum*.

SUB-FAMILY DICTYOSPHÆRIEÆ.

GENUS TETRACOCCUS West, 1892.

624. **Tetracoccus botryoides** West.

S.E.—Skipwith Common.

GENUS BOTRYOCOCCUS Kütz., 1849.

625. **Botryococcus Braunii** Kütz.

S.W.—Bradford. Cragg Vale, towards Blackstone Edge.

MID W.—Arthington. Cray Moss. Giggleswick Common. Two miles south of Clapham.

N.W.—Bog near Widdale Beck. Great Shunnor Fell.

N.E.—Gormire; Strensall (W. B. Turner). Pilmoor, near Thirsk. Near Scarborough.

S.E.—Hornsea Mere.

626. **Botryococcus calcareus** West.

MID W.—Malham.

GENUS DICTYOSPHÆRIUM Näg., 1849.

627. **Dictyosphærium Ehrenbergianum** Näg.

S.W.—Bradford.

MID W.—Baildon. Cam Fell.

N.W.—Mickle Fell.

N.E.—Scarborough Mere. Strensall.

S.E.—Hornsea Mere. Newsholme.

628. **Dictyosphærium pulchellum** Wood.

S.W.—Near Bradford, in profusion amongst *Scenedesmus bijugatus.*

MID W.—Cocket Moss, near Giggleswick.

N.W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Terrington.

S.E.—Skipwith Common.

629. **Dictyosphærium oviforme** Lagerh.

MID W.—Abundant in pond near Boston Spa (iv. 1897).

N.E.—Pilmoor, near Thirsk.

This species has not previously been recorded for the British Isles.

GENUS INEFFIGIATA West & G. S. West, 1897.

630. **Ineffigiata neglecta** West & G. S. West, 1897.

S.W.—Near Bradford.

MID W.—Malham. Markington! (Rev. J. S. Tute). Wigton Moor. Bog, two miles south of Clapham. Roundhay Park, Leeds. Staveley Dam, near Knaresborough.

N.E.—Strensall. Pilmoor, near Thirsk. Malton.

S.E.—Riccall Common.

SUB-FAMILY GLÆOCYSTIDÆ.

GENUS OOCARDIUM Näg., 1849.

631. **Oocardium stratum** Näg., 1849. [Syn. ? *Lithonema crustacea* Hass.; *Rivularia crustacea* Carm.].

MID W.—On stones in stream, Gordale, abundant. Austwick.

GENUS NEPHROCYTIUM Näg., 1849.

632. **Nephrocytium Agardhianum** Näg.

N.W.—Mickle Fell.

N.E.—Gormire (W. B. Turner).

S.E.—Riccall Common.

633. **Nephrocytium Nägelii** Grun.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

S.E.—Newsholme.

634. **Nephrocytium lunatum** West.

MID W.—Staveley Dam, near Knaresborough.

N.E.—Pilmoor, near Thirsk.

635. **Nephrocytium ecdysiscepanum** West & G. S. West, 1897.

N.E.—Pilmoor, near Thirsk (vi. 1898).

636. **Nephrocytium allantoideum** Bohlin, 1897.

N.E.—Pilmoor, near Thirsk (vi. 1898).

This species was described by Bohlin in Bihang till K. Svenska Vet.-Akad. Handl., Band 23, afd. iii., no. 7.

It has not been previously recorded for the British Isles.

GENUS OOCYSTIS Näg., 1855.

637. **Oocystis solitaria** Wittr., 1879.

MID W.—Whernside. Penyghent. Near Oughtershaw. Cocket Moss, near Giggleswick.

N.W.—Sedbergh. Cronkley Fell. Birkdale Tarn Moss. Hunter's Hole, Craydale Moor (1,900 ft.). Mossdale Moor, Widdale Fell. Bog, near Widdale Beck. Jervaulx Abbey. Mickle Fell.

N.E.—Pilmoor, near Thirsk. Malton.

S.E.—Hornsea Mere. Market Weighton.

Forma **major** Wille, 1879.

N.W.—Mossdale Moor, Widdale Fell.

638. **Oocystis crassa** Wittr.

MID W.— Malham Tarn Bog. Abundant near Oughtershaw Tarn.

N.W.—Hunter's Hole, Craydale Moor (1,900 ft.). Dodd Fell (2,000 ft.). Snaizeholme Beck.

639. **Oocystis asymmetrica** West.

MID W.—Whernside (2,000 ft.). Cam Fell.

N.W.—Cowgill Wold Moss, Widdale Fell.

640. **Oocystis elliptica** West.

N.E.—Strensall Common.

641. **Oocystis panduriformis** West.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

642. **Oocystis gigas** Arch.

N.W.—Mickle Fell.

GENUS GLŒOCYSTIS Näg., 1849.

643. **Glæocystis gigas** (Kütz., 1845) Lagerh., 1883. [Syn. *Protococcus gigas* Kütz., 1845; *Chlorococcum gigas* (Kütz) Grun.; *Glæocystis ampla* (Kütz.) Rabenh.].

S.W.—Goole Moor. Near Keighley.

MID W.—Bramhope (J. Abbott). Adel Bog. Malham Tarn. Wigton Moor. Baildon. Penyghent. Bride Cross, above Farnley Moor. Oughtershaw Tarn. Near Buckden. Cocket Moss, near Giggleswick.

N.W.—Mickle Fell. Great Shunnor Fell. Hunter's Hole, Craydale Moor (1,900 ft.). Lund's Fell.

N.E.—Strensall ! (W. B. Turner). Gormire (W. B. Turner). Scarborough Mere. Pilmoor, near Thirsk. Terrington. Malton.

S.E.—Near Meaux Abbey. Newsholme. Riccall Common. Skipwith Common ! (Rev. W. Fowler).

644. **Glæocystis regularis** West & G. S. West.

[Syn. *Chlorococcum regulare* West].

MID W.—Whernside (2,000 ft.). Penyghent. Oughtershaw Tarn. Cam Fell. Old Cote Moor. Cocket Moss, near Giggleswick. Bowland Knotts.

N.W.—Hunter's Hole, Craydale Moor (1,900 ft.). Mossdale Moor, Widdale Fell. Bog near Widdale Beck.

N.E.—Pilmoor, near Thirsk.

S.E.—Skipwith Common ! (Rev. W. Fowler).

645. **Glæocystis frustulosa** (Carm.).
[Syn. *Chlorococcum frustulosum* (Carm.) Rabenh. ?].

N.W.—Cautley Spout.

646. **Glæocystis vesiculosa** Näg.

S.W.—Rawcliffe. Near Keighley.

Mid W.—Baildon. Wigton Moor. Malham. Boston Spa. Ilkley. Cocket Moss, near Giggleswick. Bowland Knotts.

N.E.—Gormire (W. B. Turner). Strensall. On moist ground, Whitenab, Scarborough. Pilmoor, near Thirsk. Malton.

S.E.—Riccall Common. Newsholme. Routh.

647. **Glæocystis rupestris** (Lyngb., 1819) Rabenh. 1863.
[Syn. *Palmella rupestris* Lyngb., 1819].

S.W.—Horton. Bradford, on damp walls, etc. Bingley. Keighley.

Mid W.—Meanwood (W. B. Turner). Wigton Moor. Baildon. Bolton Woods. Cowside Beck, Arncliffe.

N.W.—Frequent on rocks in glens, Cautley Spout.

N.E.—Strensall! (W. B. Turner).

648. **Glæocystis botryoides** (Kütz.) Näg.

S.W.—Near Keighley.

N.W.—Mickle Fell.

649. **Glæocystis infusionum** (Schrank) West & G. S. West. [Syn. *Chlorococcum infusionum* (Schrank) Menegh.].

S.W.—Frizinghall.

Mid W.—Boston Spa.

N.E.—Pilmoor, near Thirsk.

Genus KIRCHNERIELLA Schmidle.

650. **Kirchneriella obesa** (West) Schmidle.
[Syn. *Selenastrum obesum* West].

N.E.—Pilmoor, near Thirsk.

Var. **pygmæa** West & G. S. West.

Smaller than the type. Cells narrower and less curved Thickness of cell 2 μ.

S.W.—Keighley Moor.

This is a very marked variety.

GENUS UROCOCCUS Kütz., 1849.

651. **Urococcus Hookerianus** (Hass., 1845).

MID W.—Knaresborough Dropping Well (Prof. G. J. Allman).

652. **Urococcus Allmani** (Hass., 1845).

MID W.—Knaresborough Dropping Well (Prof. G. J. Allman).

653. **Urococcus insignis** (Hass., 1845) Kütz., 1849. [Syn. *Chroococcus macrococcus* Rabenh., and var. *aureus* Rabenh.].

S.W.—Keighley Moor.

MID W.—Whernside. Holden Ghyll, near Keighley. Black Hill, near Settle. Cam Fell. Bowland Knotts. Ingleton.

N.W.—Great Shunnor Fell. Swaledale (up to 2,200 feet).

N.E.—Cornelian Bay. Pilmoor, near Thirsk.

S.E.—Near Sutton.

GENUS DACTYLOTHECE Lagerh., 1883.

654. **Dactylothece Braunii** Lagerh.

S.W.—Forming a gelatinous green stratum with *Mesotænium caldariorum* (Lagerh.) Hansg., in greenhouses, Bradford (ix. 1896).

MID W.—On wet rocks, Ilkley (vi. 1897).

This species has not previously been recorded for the British Isles.

SUB-FAMILY PROTOCOCCACEÆ.

GENUS STICHOCOCCUS Näg., 1849.

655. **Stichococcus bacillaris** Näg., 1849.

S.W. — Bradford. Saltaire, forming a dark-green stratum around the bases of trees. Damp, shady rocks near Bingley.

MID W.—Bolton Woods, on damp wood and stones. Langcliffe, near Settle.

N.E.—Gormire (W. B. Turner).

656. **Stichococcus variabilis** West & G. S. West, 1896.

S.W.—Horton Park, Bradford, forming a dark-green mucous stratum on stones subject to the spray of a waterfall.

657. **Stichococcus dissectus** Gay, 1891.

S.W.—Eccleshill, near Bradford; on damp ground, old wood, tree-pots, etc., Bradford. Swill Hill.

MID W.—Baildon Moor.

658. **Stichococcus flaccidus** (Kütz., 1849) Gay, 1891.

[Syn. *Ulothrix flaccida* Kütz., 1849].

S.W.—Bradford.

MID W.—Hawksworth. Boston Spa.

659. **Stichococcus fragilis** (A. Br.) Gay, 1891.

[Syn. *Arthrogonium fragile* A. Br.].

S.W.—In greenhouse, Bradford, forming a thin gelatinous stratum with *Dactylothece Braunii* Lagerh.

This species has not previously been recorded for the British Isles.

GENUS EREMOSPHÆRA DeBary.

660. **Eremosphæra viridis** DeBary.

MID W.—Malham Tarn Bog. Cam Fell. Bog two miles south of Clapham.

N.W.—Mickle Fell. Cronkley Fell. Bog near Widdale Beck.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk.

GENUS PLEUROCOCCUS Menegh., 1842.

661. **Pleurococcus vulgaris** Menegh.

S.W., MID W., N.W., N.E., and S.E.—On old wood, bark, etc., in moist situations, everywhere throughout the county.

662. **Pleurococcus angulosus** (Corda) Menegh.

MID W.—Penyghent.

663. **Pleurococcus rufescens** (Kütz.), Bréb.

MID W.—Forming a red stratum on wet limestone rocks, Boston Spa (iv. 1897). Ingleton. Jackdaw Crag, near Tadcaster.

Var. **sanguineus** West & G. S. West.

A variety forming a dense soft mucous layer of a bright blood colour, contents of cells granulose, and of the colour of arterial blood.

MID W.—Tennant Ghyll, a small tributary of Cowside Beck, Arncliffe (Aug., 1896).

This occurred in large brilliant blood-red patches, covering those stones and rocks which could not be displaced by the rapidity of the current, and which are often left dry. Some few cells had about a fourth-part of the contents still green.

664. **Pleurococcus nimbatus** Wildem.

N.W.—Abundant in a sphagnum bog, near Widdale Beck (iv. 1898).

N.E.—Terrington (vi. 1898).

GENUS TROCHISCIA Kütz., 1845.

665. **Trochiscia hirta** (Reinsch.) Hansg. 1888 [Syn. *Palmella hirta* Reinsch.; *Pleurococcus vestitus* Reinsch.].

MID W.—Arncliffe, on wet rocks. Boston Spa.

N.W.—Cowgill Wold Moss, Widdale Fell.

666. **Trochiscia aciculifera** (Lagerh.) Hansg. 1888. [Syn. *Acanthococcus aciculifera* Lagerh., 1883].

N.W.—Hunter's Hole, Craydale Moor (1,900 feet).

N.E.—Pilmoor, near Thirsk (vi. 1898).

667. **Trochiscia reticularis** (Reinsch.) Hansg.

MID W.—Near Knaresborough (viii. 1898).

N.W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Terrington (vi. 1898).

GENUS PROTOCOCCUS Ag., 1824.

668. **Protococcus viridis** Ag.

[Syn. *Chlorococcum humicolum* (Näg.) Rabenh.].

S.W.—Frequent about Bradford.

MID W.—Common about Leeds (Abbott, Emsley & Turner). Baildon.

N.W.—Common, Lund's Fell.

669. **Protococcus protogenitus** (Bias.) Hansg. [Syn. *Microcystis protogenita* Rabenh.].

S.W.—Saltaire. Wigton Moor.

S.E.—Routh.

670. **Protococcus botryoides** Kütz.) Kirchn. [Syn. *Microhaloa botryoides* Kütz.]

S.W.—On submerged twigs, Frizinghall (iii. 1897).

N.E.—Carlton Bank.

CLASS **MYXOPHYCEÆ.**

ORDER HORMOGONEÆ.

SUB-ORDER HETEROCYSTEÆ.

FAMILY *RIVULARIACEÆ.*

GENUS AMPHITHRIX Kütz., 1843.

671. **Amphithrix janthina** (Mont.) Born. et Flah.

MID W.—On inundated stones, Cowside Beck, Arncliffe.

N.W.—Mossdale Moor, Widdale Fell (iv. 1897) on dripping limestone rocks with *Dactylococcus bicaudatus* var. *subramosum.*

This species has not previously been recorded for the British Isles.

GENUS CALOTHRIX Ag., 1824.

672. **Calothrix parietina** (Nag., 1849), Thur., 1875.

MID W.—Simon's Fell (iv. 1892). On inundated stones, Cowside Beck, Arncliffe.

N.W.—Vertical face of dripping rocks, Hell Ghyll Beck.

673. **Calothrix balearica** Born. et Flah., 1886.

Var. **tenuis** West & G. S. West.

A variety with the filaments only about half the thickness of the type. The filaments are very tortuose and intricate, and heterocysts are absent. Thickness trich. 3·5–5 μ. The sheaths are mostly truncate, and in older filaments are of a characteristic smoky-brown colour.

MID W.—Simon's Fell (iv. 1892).

GENUS RIVULARIA (Roth.) Ag., 1824.

674. **Rivularia hæmatites** (DC., 1806) Ag., 1824.
[Syn. *Zonatrichia calcarea* Endl., 1843; *Z. rivularis* Rabenh., 1865; *Z. fluviatilis* Rabenh., 1865].

MID W.—Forming hard lumps on stones in streams in limestone districts. Abundant in Gordale. On rocks over which the water was running quickly. Penyghent. Ingleton, near Thornton Force.

N.E.—Moorland rill, near Scarborough.

675. **Rivularia Biasolettiana** Menegh., 1841.

MID W.—On stones in Cowside Beck, Arncliffe.

This species has not previously been recorded for the British Isles.

GENUS GLŒOTRICHIA J. Ag., 1842.

676. **Glœotrichia pisum** (Ag., 1824) Thur. 1875. [Syn. ? *Rivularia echinulata* Eng. Bot., 1814; *Echinella articulata* Eng. Fl.].

N.E.—Strensall (W. B. Turner).

677. **Glœotrichia natans** (Hedwig, 1798) Rabenh., 1847.

MID W. Recorded in Lees' Flora of West Yorkshire, p. 767, for Malham, 1789; this record is very doubtful.

N.W. Land's Fell, in a ditch.

N.E. Pilmoor, near Thirsk.

FAMILY *SIROSIPHONIACEÆ*.

GENUS HAPALOSIPHON Näg., 1849.

678. **Hapalosiphon Hibernicus** West & G. S. West, 1896

N.W. Bog near Widdale Beck.

N.E. Pilmoor, near Thirsk.

S.E. Skipwith Common.

679. **Hapalosiphon intricatus** West.

MID W. Cricket Moss, near Giggleswick.

GENUS STIGONEMA Ag., 1824.

680. **Stigonema ocellatum** (Dillw., 1809) Thur., 1875.

MID W. Cricket Moss, near Giggleswick.

N.W. Near Scalebar.

N.E. Pilmoor, near Thirsk.

681. **Stigonema minutum** (Ag., 1827) Hass., 1845.

N.W. Ingleton.

MID W. Ingleton.

682. **Stigonema turfaceum** (Berk., 1836) Cooke, 1884.

MID W. [illegible]

MID W.—Linn Gill.

N.W.—Cronkley Fell.

683. **Stigonema mamillosum** (Lyngb., 1819) Ag. 1824.

N.W.—Cronkley Fell.

684. **Stigonema panniforme** (Ag.) B. & F.

N.E.—Pilmoor, near Thirsk (vi. 1898).

685. **Stigonema informe** Kütz., 1849.

MID W.—Ingleborough.

N.W.—Cautley Spout; very fine with *Scytonema mirabile.*

FAMILY *SCYTONEMACEÆ.*

GENUS MICROCHÆTE Thur., 1875.

686.—**Microchaete diplosiphon** Gomont, 1885.

N.E.—Strensall.

Thickness of filament up to 14 μ; thickness of trichome 5·5–6 μ. The outer sheath in these specimens was often irregular and attained rather wider proportions than in the original French plants.

GENUS SCYTONEMA Ag., 1824.

687. **Scytonema Myochrous** (Dillw., 1802) Ag. 1812.

MID W.—Ingleton. Cowside Beck, Arncliffe (very fine masses).

N.W.—Cronkley Fell. Sedbergh.

688. **Scytonema mirabile** (Dillw.)

[Syn. *S. figuratum* Ag., 1824].

N.W.—Cronkley Fell. Lund's Fell. Cautley Spout.

MID W.—Linn Gill, on wet rocks.

689. **Scytonema alatum** (Berk., 1833) Borzi, 1879.

[Syn. *Petalonema alatum* Berk., 1833].

MID W.—Dripping rocks, Gordale. Linn Gill, on wet limestone rocks.

GENUS TOLYPOTHRIX Kütz., 1843.

690. **Tolypothrix distorta** (Fl. Dan., 1780) Kütz., 1843.

[Syn. *Pectonema Kirchneri* Cooke, 1882].

MID W.—Baildon.

N.E.—Pilmoor, near Thirsk; very fine.

691. **Tolypothrix lanata** (Desv., 1809) Wartm., 1858. [Syn. *T. muscicola* Kütz., 1843; *T. flaccida* Kütz., 1843; *T. coactilis* Kütz., 1843; *T. ægagropila* (Kütz., 1833) Rabenh., 1862].

MID W.—Dringhouses, near York, growing on *Hypnum giganteum*. Harrogate! (T. Hick). South Stainley! (Rev. J. S. Tute). Boston Spa.

N.W.—Sedbergh.

N.E.—Stokesley.

S.E.—Riccall Common.

692. **Tolypothrix tenuis** Kütz., 1843. [Syn. *T. pygmæa* Kütz., 1843; *T. Wartmanniana* Rabenh., 1858].

S.W.—Rawcliffe Common.

MID W.—Penyghent.

N.W.—Cronkley Fell.

N.E.—Near Scarborough.

S.E.—Riccall Common. Skipwith Common! (Rev. W. Fowler).

GENUS DIPLOCOLON Näg., 1857.

693. **Diplocolon Heppii** Näg., 1857.

MID W.—On the vertical face of dripping limestone rocks, Helln Pot, near Selside (vii. 1892).

This plant was growing amongst and agglutinated with several species of *Glæocapsa*, and formed an irregularly-lobed subcartilagenous thallus of a dark brownish-green colour. The trichomes are about 8 μ in diameter, comparatively short, and tortuose-intricate. The margins of the outer sheaths could be seen only with difficulty, and in many cases not at all, but the trichomes were frequently seen both singly and in pairs in evidently inner lamellose sheaths; the latter were either colourless or, in older examples, of a pale yellow-brown colour. The branches arise between the heterocysts.

The cells are bright blue-green in colour, subglobose, and contain many large distinct granules; the heterocysts are also subglobose, single or occasionally in pairs, and are of a pale straw colour.

This species has not previously been recorded for the British Isles.

FAMILY *NOSTOCEÆ*.

GENUS NOSTOC Vauch., 1803.

694. **Nostoc piscinale** Kütz., 1843.

S.W.—Near Bradford.

695. **Nostoc muscorum** Ag., 1812.

MID W.—Near Ingleton. Heseltine Gill, on the eastern slope of Penyghent, and several gills on the western slope. Cowside Beck, Arncliffe.

N.W.—Lund's Fell.

N.E.—Strensall.

Var. **tenax** Thur., 1880.

MID W.—Cowside Beck, Arncliffe.

696. **Nostoc humifusum** Carm., 1883.

S.W.—Cullingworth.

N.W.—Mickle Fell.

697. **Nostoc commune** Vauch., 1803.

S.W.—Wentbridge (H. F. Parsons). Manningham.

MID W.—Ripon (F. A. Lees). Knaresborough (W. B. Turner). Wetherby (F. A. Lees). Arncliffe. Sherburn (F. A. Lees). Near Jennett's Cave, Malham (C. P. Hobkirk).

698. **Nostoc macrosporum** Menegh., 1843.

MID W.—Heseltine Gill, Penyghent.

N.W.—Deep Dale, Dent (iii. 1893).

699. **Nostoc microscopicum** Carm., 1833 [Syn. *Nostoc rupestre* Kütz., 1850; *N. hyalinum* Benn., 1886; *N. opalinum* Benn.].

S.W.—Halifax.

MID W.—Ingleborough. Clapham. Malham. Ribblehead. Whernside. Old Cote Moor.

N.W.—Cautley Spout. Cronkley Fell. Lund's Fell.

N.E.—Carlton Bank.

S.E.—Riccall Common. Market Weighton.

700. **Nostoc cœruleum** Lyngb., 1819.

MID W.—Baildon.

N.W.—Mickle Fell. Great Shunnor Fell.

701. **Nostoc pruniforme** Ag., 1812.

MID W.—Beamsley Beacon. Penyghent (iv., 1896). Malham Tarn, 1789, recorded as *Ulva pruniformis* (see Camden's Britannia, enlarged edit., by R. Gough, iii. p. 101).

702. **Nostoc verrucosum** Vauch., 1803.

MID W.—On rocks, Malham Cove (H. F. Parsons).

N.W.—Mickle Fell.

703. **Nostoc sphæricum** Vauch., 1803.

S.W.—Near Bradford.

MID W.—Ingleton. Holden Gill, near Keighley.

GENUS ANABÆNA Bory, 1822.

Sterile species from Frizinghall; Cam Fell; Pilmoor, near Thirsk.

704.—**Anabæna Flos-aquæ** (Lyngb., 1819) Bréb., 1835.

S.E.—Hornsea Mere.

705.—**Anabæna circinalis** (Kütz., 1845) Rabenh., 1852.

N.E.—Strensall (W. B. Turner).

706.—**Anabæna oscillarioides** Bory, 1822.

[Syn. *Sphærozyga Ralfsii* Thwaites, 1849].

MID W.—Ilkley (vi., 1897).

S.E.—Newsholme.

Var. **elongata** (Kütz., 1849) Born. et Flah. [Syn. *Cylindrospermum elongatum* Kütz., 1849; *Sphærozyga elasticha* Ralfs, 1850; *S. leptosperma* Ralfs, 1850].

N.W.—Mickle Fell.

707. **Anabæna laxa** (Rabenh.) A. Braun.

S.W.—Cragg Vale, towards Blackstone Edge.

This species has not previously been recorded for the British Isles.

GENUS APHANIZOMENON Morren, 1838.

708. **Aphanizomenon Flos-aquæ** (L., 1753) Ralfs, 1850.

N.E.—Strensall Common.

A form a little smaller; cfr. West, Notes on F.W.A. of E. Yorks. (Naturalist, July, 1893, p. 217).

S.E.—Riccall Common.

GENUS CYLINDROSPERMUM Kütz., 1843.

709. **Cylindrospermum stagnale** (Kütz., 1843) Born et Flah., 1888. [Syn. *Anabæna stagnalis* Kütz., 1843; *Cylindrospermum macrospermum* Kütz., 1845].

MID W.—Ribblehead, in peaty ditches and pools. Staveley Dam, near Knaresborough.

N.E.—Pilmoor, near Thirsk.

710. **Cylindrospermum majus** Kütz., 1843. [Syn. *Cylindrospermum macrospermum* Rabenh., 1860; Cooke, Brit. Freshw. Alg., p. 243, t. 95, f. 1].

S.W.—Bradford. Halifax. Dewsbury (W. Narramore). Doncaster! (Rev. W. Fowler).

N.E.—Terrington.

711. **Cylindrospermum catenatum** Ralfs, 1850.

S.W.—Goole (W. G. Tacey).

MID W.—Markington! (Rev. J. S. Tute).

SUB-ORDER HOMOCYSTEÆ.

FAMILY *VAGINARIEÆ*.

GENUS SCHIZOTHRIX Kütz., 1843.

712. **Schizothrix Mülleri** Näg., 1849.

MID W.—Forming a brown expanded stratum amongst mosses on wet rocks, Linn Gill.

713. **Schizothrix lardacea** (Cesati) Gomont.

MID W.—Amongst *Scytonema myochrous*, forming a dense stratum, Cowside Beck, Arncliffe.

This species has not previously been recorded for the British Isles.

714. **Schizothrix calcicola** (Ag., 1812) Gomont.

MID W.—Amongst *Scytonema* sp., on wet rocks, Linn Gill.

This species has not previously been recorded for the British Isles.

FAMILY *LYNGBYEÆ.*

SUB-FAMILY LYNGBYOIDEÆ.

GENUS PLECTONEMA Thur., 1875.

715. **Plectonema Tomasinianum** (Kütz., 1836) Bornet, 1889. [Syn. *Calothrix Tomasinianum* Kütz., 1843; *Plectonema mirabile* Thur., 1875].

MID W.—Ingleton. Malham. Forming expanded greenish-brown tufts on wet rocks, Simon's Fell (iv., 1892). Thickness, filaments, 16—19 μ; thickness, trichome, 12·5—15 μ.

At or near the base of a few of the branches peculiar rounded cells of a yellowish colour and with thick walls were occasionally noticed; these are most probably spores.

N.W.—Snaizeholme Beck. Widdale Beck.

N.E.—Rievaulx Abbey.

GENUS SYMPLOCA Kütz., 1843.

716. **Symploca muralis** Kütz., 1843.

S.W.—On damp ground, Frizinghall. Thickness, trichome, 3·7—4·5 μ.

GENUS LYNGBYA Ag., 1824.

717. **Lyngbya Martensiana** Menegh., 1837. [Syn. *Oscillatoria turfosa* Carm., 1841; *Lyngbya turfosa* (Carm.) Cooke, 1884].

S.W.—Doncaster.

MID W.—Linn Gill.

N.W.—Vertical face of dripping rocks, Hell Gill Beck.

In 1888 we recorded *Lyngbya turfosa* from Doncaster. Since then M. Gomont's Monograph of this group has been issued (1893) and in it we find *Oscillatoria turfosa* in a list of "*Species inquirendæ.*" We have re-examined this plant and find that it corresponds exactly with Cooke's figure (Brit. Freshw. Alg., pl. 102, f. 3) of *Lyngbya turfosa* which he states (l.c. p. 261) to be

drawn "from the original specimens." Our specimens also agree in every detail with *Lyngbya Martensiana* with the exception that the dissepiments are quite distinct, and we do not consider this fact to be of any specific value, more especially as some of the trichomes were breaking up into their component cells previous to the latter leaving the sheath; this condition of the plants might probably account for the distinctness of the dissepiments. From this we must regard *Oscillatoria turfosa* Carm. as synonymous with *Lyngbya Martensiana* Menegh.

718. **Lyngbya ærugineo-cœrulea** (Kütz., 1843) Gomont, 1893.

S.W.—Horton Park, Bradford.

MID W.—Waterfall, Crook Gill near Buckden. Simon's Fell (iv. 1892). Boston Spa. On wet rocks, in stream, Penyghent. Linn Gill.

N.W.—On stones, waterfall in gill, Dodd Fell.

719. **Lyngbya subtile** West.

MID W.—Wigton Moor.

720. **Lyngbya ochracea** (Kütz., 1843) Thur., 1875. [Syn. *Leptothrix ochracea* Kütz., 1843].

S.W.—Keighley. Hunslet (W. B. Turner). Frizinghall. Clayton.

MID W.—Blubberhouses (W. B. Turner). Harrogate. Cocket Moss, near Giggleswick.

N.E.—Strensall (W. B. Turner). Terrington.

721. **Lyngbya Lagerheimii** (Mœbius, 1889) Gomont, 1890.

MID. W.—Penyghent.

S.E.—Skipwith Common.

This species has not previously been recorded for the British Isles.

722. **Lyngbya major** Meneghini, 1837.

N.E.—Terrington.

This species has not previously been recorded for the British Isles.

723. **Lyngbya Rivulariarum** Gomont, 1893.

MID W.—Among the filaments of *Rivularia hæmatites*, on wet rocks, Penyghent.

724. **Lyngbya versicolor** (Wartm., 1861) Gomont, 1893.

MID W.—Among *Schizothrix Müllleri* Näg., on wet rocks, Linn Gill.

SUB-FAMILY OSCILLARIOIDEÆ.

GENUS PHORMIDIUM Kütz., 1843.

725. **Phormidium molle** (Kütz., 1849) Gomont, 1893. [Syn. *Anabæna mollis* Kütz., 1849].

N.E.—Pilmoor, near Thirsk.

Forma **tenuior**. Thickness, trichome 2—2·4 μ; long. artic. 2·2—3·5 μ.

S.W.—Bradford. This formed bright æruginose coatings on the roots and fronds of *Lemna minor*. It differs in no respect from the type except in the somewhat narrower trichomes.

726. **Phormidium luridum** (Kütz., 1849) Gomont, 1893. [Syn. *Leptothrix lurida* Kütz., 1849; *Hyphæothrix lurida* Rabenh., 1865.]

S.W.—Frizinghall. Horton Park, Bradford. Heaton. Thickness, filaments 1·6—2 μ; long. artic. 2·5—4·2 μ.

MID W.—Boston Spa.

N.E.—Stokesley.

727. **Phormidium purpurascens** (Kütz., 1847) Gomont. 1890.

[Syn. *Leptothrix purpurascens* Kütz., 1847].

MID W.—Forming bright reddish-purple coriaceous patches, some square feet in extent, on the face of dripping limestone rocks, Linn Gill. The stratum has a smooth shining surface and consists of densely intricate and tortuose minute filaments (thickness, trichome 1·5—2 μ). Also on dripping limestone rocks, Cowside Beck, near Arncliffe. Ingleton.

This species has not previously been recorded for the British Isles.

728. **Phormidium valderianum** (Delp., 1857) Gomont, 1893. [Syn. *Leptothrix Valderiæ* Delp., 1857; *Hyphæothrix zonata* (Ces.) Rabenh., 1865.

MID W.—On the shady boulders of rapid stream, forming a thin dark olive-green stratum; Holden Gill, near Keighley. Thickness, trichome, 2—2·3 μ; long. artic. 3·5—5 μ.

729. **Phormidium laminosum** (Ag., 1827) Gomont, 1890. [Syn. *Oscillatoria laminosa* Ag., 1827].

MID W.—On stones in stream, Langcliffe, near Settle.

N.W.—Helln Pot, near Selside.

730. **Phormidium tenue** (Menegh., 1837) Gomont, 1893. [Syn. *Anabæna tenuis* Menegh., 1837.

S.W.—Cragg Vale, towards Blackstone Edge. Clayton.

MID W.—Shipley Glen. Boston Spa.

N.W.—Cautley Spout.

731. **Phormidium inundatum** Kütz., 1849. [Syn. *Lyngbya inundata* (Kütz.) Cooke, 1884].

S.W.—Bradford.

Mid W.—Not uncommon on dripping rocks, stones in streams, lakes, etc. Wetherby. Chapel-Allerton. Selby. Penyghent.

732. **Phormidium Corium** (Ag., 1812) Gomont, 1890. [Syn. *Oscillatoria Corium* Ag., 1812].

S.W.—Horton Park, Bradford. Cragg Vale, towards Blackstone Edge.

MID W.—Linn Gill.

N.W.—On rocks, in stream, Little Ing Gill, Dodd Fell.

733. **Phormidium Retzii** (Ag. 1812) Gomont, 1890. [Syn. *Oscillatoria Retzii* Ag., 1812; *Phormidium rupestre* Kütz., 1849; *Phormidium papyrinum* Kütz., 1843; *Lyngbya rupestris* (Kütz.) Cooke, 1884].

MID W.—Ingleton! (H. F. Parsons). Blubberhouses (W. B. Turner). Holden Gill, near Keighley.

734. **Phormidium autumnale** (Ag. 1812) Gomont, 1893. [Syn. *Oscillatoria autumnalis* Ag., 1812; *O. antilaria* Martens, 1822; *Phormidium vulgare* Kütz., 1843; *Lyngbya vulgare* (Kütz.) Kirchn. ; *Oscillaria subfusca* Kütz., 1843].

S.W.—Horton Park, Bradford. Clayton. Shipley.

MID W.—Baildon. Markington! (Rev. J. S. Tute).

N.E.—Strensall. Scarborough! (G. Massee).

735. **Phormidium foveolarum** (Montague, 1849) Gomont, 1893.

MID W.—Boston Spa, forming a dark green stratum in holes of limestone rocks.

GENUS CLONOTHRIX E. Roze, 1896.

736. **Clonothrix gracillima** West & G. S. West.

Trichomes very narrow, alternately falsely branched; false branches flexuose and sometimes attenuate, elongate with alternate false branchlets; sheaths thin, firm, straight and colourless; cells three to four times longer than the diameter, cytioplasm bright æruginose. Trichomes 1·5 μ in thickness.

S.W.—Trough, Shipley.

N.E.—Pilmoor, near Thirsk.

The false ramification of this plant is most peculiar; the apparent branches seem to be merely tangentially applied at their bases to the primary filaments, and are of the same thickness. The 'branches' appear to arise by the lateral protension of a few cells from the sheath; these cells remain attached laterally and grow quite independently into long flexible filaments. The cells were often seen to have left the sheath, the latter being empty for some distance.

The only other species of the genus is *C. fusca* E. Roze (Journ. de Botanique, Oct. 1896, p. 329-330), from which it is distinguished by its much narrower trichomes of uniform thickness, its more elongate false-ramifications, and by its bright blue-green colour.

GENUS OSCILLATORIA Vauch., 1803.

737. **Oscillatoria princeps** Vauch., 1803.

MID W.—Malham Tarn Bog; very fine, Aug. 1896.

N.E.—Pilmoor, near Thirsk; vii. 1898.

738. **Oscillatoria limosa** Ag., 1812.

[Syn. *Oscillaria Frœlichii* Kütz., 1843].

S.W. —Bradford. Dewsbury. Frizinghall. Wibsey. Farnley.

MID W.—Wetherby (F. A. Lees). Baildon. Wigton Moor. Malham. Moughton Fell. Penyghent. Pond at Pool. Holden Gill, near Keighley. Eldwick. Boston Spa. Staveley Dam, near Knaresborough. Ilkley.

N.W.—Masham. Near Moorcock Inn. Great Shunnor Fell. Mickle Fell. Dodd Fell.

N.E.—Strensall. Scarborough Mere. Hayburn Wyke. Stokesley.

S.E.—Waghen. Beverley. Routh. Loftsome Bridge, near Wressle. Newsholme, near Howden.

739. **Oscillatoria irrigua** Kütz., 1843.

This species frequently forms dark purple velvety patches over which the water runs quickly.

S.W.—Keighley. Farnley. Near Halifax.

MID W.—Addingham. Arthington. Baildon. Oughtershaw Moss.

N.W.—River Ure. Duerley Beck near Hawes. Sedbergh.

740. **Oscillatoria tenuis** Ag., 1813.

[Syn. *Oscillaria tenuis* var. *viridis* Kütz., 1849].

S.W.—Wakefield. Bradford. Frizinghall. Halifax.

MID W. — Sherburn. Baildon. Leeds. Pond at Pool. Staveley Dam, near Knaresborough. Ilkley.

N.W.—Sedbergh. Mickle Fell.

N.E.—Seamer. Malton.

741. **Oscillatoria amphibia** Ag., 1827.

[Syn. *Oscillaria tenerrima* Kütz., 1843].

S.W.—Bradford. Frizinghall. Kildwick. Doncaster.

MID W.—Above Eldwick. Cam Fell.

N.W.—Mickle Fell. Muker.

From above Eldwick there was a rather more slender form (thickness, trichome 1·3—2 μ) with markedly uncinate apices.

742. **Oscillatoria splendida** Grev., 1824.

[Syn. *Oscillaria leptotricha* Kütz., 1845.]

S.W.—Bradford. Calverley.

MID W—Adel Bog.

N.W.—Near Moorcock Inn. Mickle Fell.

N.E.—Stokesley.

Var. **attenuata** West & G. S. West, 1896. Thickness, trichome 2—2·3 μ.

The apices of this variety are much more elongated and attenuate (up to 30 μ) than the apices of the typical form, though like those they are subcapitate.

MID W.—In ditches, Baildon Moor (vii. 1895).

743. **Oscillatoria Okeni** Ag., 1827.

S.W.—Trough at Heaton.

This species has not previously been recorded for the British Isles.

744. **Oscillatoria chalybea** Mertens, 1822.

S.W.—Near Keighley.

N.E.—York! (F. Bewlay). Terrington.

745. **Oscillatoria formosa** Bory, 1827.

N.W.—Little Ing Gill, Dodd Fell.

N.E.—Scarborough.

746. **Oscillatoria simplicissima** Gomont, 1893.

S.W.—Marley.

MID W.—Cocket Moss, near Giggleswick (iv. 1898).

747. **Oscillatoria anguina** Bory, 1827.

MID W.—Cocket Moss, near Giggleswick (iv. 1898). Ingleton, amongst mosses.

This species has not previously been recorded for the British Isles

GENUS ARTHROSPIRA Stizberger, 1852.

748. **Arthrospira Jenneri** (Hass., 1845) Stizenberger, 1852. [Syn. *Spirulina Jenneri* Kütz., 1845-49].

S.W.—Askern (Rev. F. H. Allen).

SUB-FAMILY SPIRULINOIDEÆ.

GENUS SPIRULINA Turpin, 1827.

749. **Spirulina major** Kütz., 1843.

[Syn. *Spirulina oscillarioides* Kütz., 1845-49].

MID W.—Bramhope (Abbott, Emsley and Turner). Adel. Arthington.

N.W.—Mickle Fell.

N.E.—Scarborough Mere. Strensall.

750. **Spirulina tenuissima** Kütz., 1836.

[Syn. *Spirulina subsalsa* Œrsted, 1842].

S.W.—Holmfirth (C. P. Hobkirk).

ORDER CHAMÆSIPHONACEÆ.

FAMILY *CHAMÆSIPHONEÆ.*

GENUS SPHÆROGONIUM Rostaf., 1883.

751. **Sphærogonium incrustans** (Grun.) Rostaf., 1883.

[Syn. *Chamæsiphon incrustans* Grun., 1868].

S.W.—Heaton, on *Vaucheria* sp. and *Rhizoclonium hieroglyphicum.* Keighley, on *Œdogonium* sp.

MID W.—Baildon, on *Cladophora crispata.* In stream near Giggleswick, on *Chætomorpha.*

N.W.—Cautley Spout, on *Œdogonium* sp. Widdale Beck, on *Plectonema.*

ORDER CHROOCOCCOIDEÆ.

FAMILY *CHROOCOCCACEÆ.*

SUB-FAMILY CHROOCYSTEÆ.

GENUS GLŒOCHÆTE Lagerh., 1883.

752. **Glœochæte Wittrockiana** Lagerh., 1883.

[Syn. *Schrammia barbata* Dangeard, 1889].

MID W.—Half-a-mile south of Cray Moss (viii. 1896).

N.E.—Pilmoor, near Thirsk, very fine (iv. 1897).

753. **Glœochæte bicornis** Kirchn.

MID W.—In pond, Boston Spa (iv. 1897).

This species has not previously been recorded for the British Isles.

SUB-FAMILY EUCHROOCOCCACEÆ.

GENUS CHROOTHECE Hansg., 1884.

754. **Chroothece Richterianum** Hansg.

MID W.—Cowside Beck, Arncliffe, forming reddish-yellow patches in the stratum of *Phormidium purpurascens*. Rather smaller than the type; diam. cell. c. integ. 13·5—18 μ.

GENUS GLŒOTHECE Näg., 1849.

755. **Glœothece linearis** Näg.

MID W.—Old Cote Moor (viii. 1896), very fine and abundant.

N.W.—Cowgill Wold Moss, Widdale Fell (iv. 1897).

N.E.—Strensall Common. Pilmoor, near Thirsk (vi. 1898).

756. **Glœothece confluens** Näg.

MID W.—Black Hill, near Settle. Linn Gill. Jackdaw Crag, near Tadcaster.

757. **Glœothece cystifera** (Hass.) Rabenh.

[Syn. *Glœothece devia* Näg.].

MID W.—Ilkley (vi. 1897) on wet rocks.

GENUS APHANOTHECE.

758. **Aphanothece saxicola** Näg.

S.W.—Horton Park, Bradford.

MID W.—Whernside. Wigton Moor. Helln Pot, near Selside. Linn Gill.

N.E.—Pilmoor, near Thirsk.

Var. **sphærica** West, 1893.

N.E.—Pilmoor, near Thirsk.

759. **Aphanothece microscopica** Näg.

S.W.—Ogden Clough.

MID W.—Penyghent. Helln Pot, near Selside.

760. **Aphanothece nidulans** Richter, 1884.

MID W.—Forming bright green subgelatinous patches, along with *Cosmarium speciosum* var. *biforme*, on constantly wet rocks, Cowside Beck, Arncliffe. Diam. cell 1 μ.

This species has not previously been recorded for the British Isles.

GENUS SYNECHOCOCCUS Näg.

761. **Synechococcus major** Schröter.

[Syn. *S. crassus* Arch.].

S.W.—Ogden Clough.

MID W.—Adel Bog. South of Cray Moss. Cowside Beck, Arncliffe.

N.E.—Pilmoor, near Thirsk.

762. **Synechococcus æruginosus** Näg.

MID W.—Cowside Beck, Arncliffe. Langcliffe, near Settle.

N.W.—Mossdale Moor, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

GENUS DACTYLOCOCCOPSIS Hansg.

763. **Dactylococcopsis montana** West & G. S. West.

Cells solitary or associated in families of about 4 to 16; cells elliptical, barrel-shaped or oblique, with attenuated poles which are slightly rounded at apex, about two to three times longer than the diameter; cells of the families generally somewhat distant from each other, after division approximate; cytioplasm pale ærugineous. Length of cells, 8·6—11·5 μ; breadth of cells 3·5—4 μ.

The form of the cells readily distinguishes this species from *D. rupestris* Hansg. and *D. rhaphidioides* Hansg. It also has a different habitat, and the families of cells, which appear to be surrounded by a small amount of mucus, attain a somewhat larger size than in either of the two species mentioned. The cell-walls are very firm and the division of the cells is in one direction only, being somewhat oblique (as in *Dactylococcus*!). The chromatophore does not entirely fill the cell, there being a clear space near to one margin (also as in *Dactylococcus*!); there

is also a more or less conspicuous granule towards each end of the chromatophore.

S.W.—Keighley Moor.

N.W.—Cowgill Wold Moss, Widdale Fell.

GENUS GLAUCOCYSTIS Itzigs., 1854.

764. **Glaucocystis Nostochinearum** Itzigs.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mossdale Moor, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

GENUS MERISMOPEDIA Meyen, 1839.

765. **Merismopedia glauca** (Ehrenb.), Näg.

S.W.—Cullingworth. Mirfield. Greetland, near Halifax.

MID W.—Adel Bog. Whernside. Ribblehead.

N.W.—Mickle Fell. Lund's Fell. Jervaulx Abbey.

N.E.—Strensall. Scarborough Mere. Scalby Beck. Saltburn.

S.E.—Riccall Common. Peat deposit, Filey. Skipwith Common.

766. **Merismopedia punctata** Meyen.

N.E.—Rievaulx Abbey.

S.E.—Riccall Common.

767. **Merismopedia hyalina** Kütz.

S.W.—Pond, Frizinghall, among *Microthamnion Kützingianum* (iii. 1897).

768. **Merismopedia æruginea** Bréb.

MID W.—Crook Gill, near Buckden.

N.W.—Cowgill Wold Moss, Widdale Fell.

GENUS TETRAPEDIA Reinsch., 1867.

769. **Tetrapedia Reinschiana** Arch.

MID W.—Langcliffe, near Settle.

N.E.—Pilmoor, near Thirsk.

S.E.—Riccall Common. Skipwith Common.

770. **Tetrapedia glaucescens** (Wittr.) Boldt.

MID W.—Langcliffe, near Settle.

N.E.—Pilmoor, near Thirsk (iv. 1898).

GENUS CŒLOSPHÆRIUM Näg., 1849.

771. **Cœlosphærium Kützingianum** Näg.

MID W.—Ingleborough.

N.W.—Jervaulx Abbey.

GENUS GOMPHOSPHÆRIA Kütz., 1836.

772. **Gomphosphæria aponina** Kütz., 1836.

MID W.—Cam Fell (viii. 1896).

N.E.—Pilmoor, near Thirsk.

GENUS CLATHROCYSTIS Henfrey, 1856.

773. **Clathrocystis æruginosa** (Kütz.) Henfrey.

MID W.—Pond, Boston Spa (iv. 1897).

S.E.—Hornsea Mere, very fine.

774. **Clathrocystis roseo-persicinus** (Kütz.) Cohn. [Syn. *Protococcus roseo-persicinus* Kütz.; *Polycystis roseo-persicinus* (Kütz.) Gutw., 1895].

S.W.—Bradford (ix. 1896).

N.E.—Pilmoor, near Thirsk. Malton.

GENUS POLYCYSTIS Kütz., 1845.

775. **Polycystis marginata** (Menegh.) Richter. [Syn. *Microcystis marginata* (Menegh.) Kütz.; *Anacystis marginata* Menegh.].

MID W.—Old Cote Moor (viii. 1896).

776. **Polycystis elabens** (Bréb.) Kütz.

MID W.—Roundhay Park, Leeds.

N.E.—Pilmoor, near Thirsk. Carlton Bank.

777. **Polycystis Flos-aquæ** Wittr., 1879.

MID W.—Boston Spa.

778. **Polycystis viridis** A. Br., 1867.

N.E.—Pilmoor, near Thirsk.

This species has not previously been recorded for the British Isles.

GENUS GLŒOCAPSA Kütz., 1843; em. Näg., 1849.

779. **Glœocapsa didyma** Kütz.

MID W.—Helln Pot, near Selside.

780. **Gloeocapsa aeruginosa** (Carm.) Kütz.

MID W.—Helln Pot, near Selside.

781. **Gloeocapsa caldariorum** (Suring.) Rabenh.

S.W.—Greenhouse, Cullingworth (T. Hebden). Horton, Manningham Park.

782. **Gloeocapsa polydermatica** Kütz.

S.W.—Keighley. Bingley.

MID W.—Harrogate. Otley. Baildon.

N.W.—Cautley Spout.

N.E.—Strensall.

783. **Gloeocapsa arenaria** (Hass.) Rabenh.

MID W.—Holden Gill, near Keighley. Malham Tarn Bog.

N.E.—Strensall.

784. **Gloeocapsa Ralfsiana** (Harv.) Kütz.

MID W.—Penyghent (iv. 1896). Ingleborough.

GENUS APHANOCAPSA Näg.

785. **Aphanocapsa rivularis** (Carm.) Rabenh.

N.W.—Mickle Fell.

N.E.—Scarborough Mere.

786. **Aphanocapsa Grevillei** (Berk.) Rabenh.

MID W.—Ingleborough. Baildon. Helln Pot, near Selside. Linn Gill.

N.W.—Howgill Fells. Cautley Spout. Mickle Fell.

787. **Aphanocapsa testacea** (A. Br.) Näg.

MID W.—Settle (H. F. Parsons).

N.W.—Cautley Spout.

788. **Aphanocapsa Castagnei** (Kütz.) Rabenh.

N.W.—Cowgill Wold Moss, Widdale Fell.

This species has not previously been recorded for the British Isles.

GENUS PORPHYRIDIUM Näg., 1849.

789. **Porphyridium cruentum** (Ag.) Näg. [Syn. *Palmella cruenta* Ag.; *Aphanocapsa cruenta* (Ag.) Hansg.].

Forming dark purplish-red clots on damp earth, rocks, and stones.

S.W.—Sheffield (A. Carr). Bradford. Bingley. Idle. Shelf.

MID W.—Wetherby (F. A. Lees). Leeds district (J. Abbott). Selby (H. F. Parsons). Markington! (Rev. J. S. Tute).

GENUS CHROOCOCCUS Näg., 1849.

790. **Chroococcus turgidus** (Kütz.) Näg.

S.W.—Cullingworth. Steeton. Elslack.

MID W.—Holden Gill (T. Hebden). Wigton Moss. Ingleborough. Whernside. Baildon. Malham Tarn Bog. Penyghent. Cam Fell. Giggleswick Common.

N.W.—Baugh Fell. Snaizeholme Fell. Cautley Spout.

N.E.—'Frequent.' Pilmoor, near Thirsk.

S.E.—Riccall Common. Hornsea Mere. Sandholme. Market Weighton.

791. **Chroococcus helveticus** Näg.

S.W.—Ogden Clough.

MID W.—Wet rocks, Shipley Glen (vii. 1895). Holden Gill, near Keighley. South of Cray Moss.

N.W.—Lund's Fell.

This species has not previously been recorded for the British Isles.

792. **Chroococcus giganteus** West.

N.W.—Hunter's Hole, Craydale Moor (1,900 feet).

793. **Chroococcus cohærens** (Bréb.) Näg.

MID W. — Penyghent. Cocket Moss, near Giggleswick. Staveley Dam, near Knaresborough.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk.

794. **Chroococcus minor** (Kütz.) Näg.

S.W.—Ogden Clough.

MID W.—Kilnsey. Langcliffe, near Settle.

N.W.—Cowgill Wold Moss, Widdale Fell.

N.E.—Pilmoor, near Thirsk.

Forma **major** West.

N.W.—Cronkley Fell.

795. **Chroococcus pallidus** Näg.

MID W.—On dripping rocks, Shipley Glen (iv. 1895). Near Buckden. Old Cote Moor. Helln Pot, near Selside. Linn Gill.

N.W.—Mossdale Moor, Widdale Fell. Lund's Fell.

796. **Chroococcus rufescens** (Bréb.) Näg.

MID W.—Holden Gill, near Keighley. Cowside Beck, Arncliffe.

N.E.—Pilmoor, near Thirsk.

797. **Chroococcus schizodermaticus** West.

S.W.—On wet rocks, near Bingley.

MID W.—Boston Spa. Linn Gill.

N.W.—Cautley Spout, very fine.

Var. **badio-purpureus** West & G. S. West.

MID W.—Helln Pot, near Selside.

BACILLARIEÆ.

ORDER RAPHIDIEÆ.

FAMILY *CYMBELLEÆ.*

GENUS AMPHORA Ehrenb., 1831.

798. **Amphora ovalis** Kütz.

S.W.— Roche Abbey (E. Hunter). Marley, near Bingley. Cullingworth. Near Keighley. Doncaster. Askern, Cusworth and Hatfield districts; Firsby reservoir; Roche Abbey; Rossington (M. H. Stiles).

MID W. — South Milford (W. B. Turner). Baildon. Moughton Fell. Malham Cove (J. M. Kirk). Malham Tarn. Kilnsey. Otley. Boston Spa. Ingleton.

N.W.—Cotterdale. Jervaulx Abbey.

N.E. — Seamer. Scarborough Mere. Whitby. Staindale. Cornelian Bay. Saltburn.

S.E.—Routh. Beverley. Tickton. Loftsome Bridge, near Wressle. Market Weighton.

Var. **affinis** Kütz.

S.W.—Cusworth district (M. H. Stiles).

Var. **Pediculus** Kütz. [Syn. *Amphora Pediculus* (Kütz.) Grun.; *Amphora minutissima* W. Sm.].

S.W.—Heaton. Hatfield district; Doncaster town water; Roche Abbey (M. H. Stiles).

N.W.—Mickle Fell.

N.E.—Staithes.

S.E.—Beverley; Cottingham; near Woodmancy; Newbald (G. Norman).

799. **Amphora Normanii** Rabenh.

S.E.—Hull (G. Norman). Growing on wall of greenhouse.

800. **Amphora hyalina** Kütz.

S.W.—Goole (E. Hunter).

GENUS CYMBELLA Ag., 1830.

801. **Cymbella Ehrenbergii** Kütz.

S.W.—Cusworth, near Doncaster! (M. H. Stiles).

MID W.—Malham Tarn.

N.E.—Scarborough Mere. Seamer.

S.E.—Hornsea Peat Deposit; Cottingham; Spring Ditch (G. Norman).

802. **Cymbella cuspidata** Kütz.

S.W. — Greetland, near Halifax. Roche Abbey (J. N. Coombe). Swill Hill. Ogden Clough. Liversedge! (Rev. W. Fowler). Cragg Vale, towards Blackstone Edge. Askern and Cusworth districts (M. H. Stiles).

MID W.—Adel Bog. Rombald's Moor. Harrogate! (G. Norman). Near Norwood Hall, above Lindley Reservoir. Eldwick. Ribblehead. Boston Spa. Cocket Moss, near Giggleswick. Hawksworth Springs. Ilkley.

N.E.—Levisham. Terrington. Saltersgate (G. Norman).

S.E.—Beverley. Tickton. Cottingham (G. Norman).

Var. **naviculiformis** Auersw.

S.W.—Cusworth, Hatfield, and Roche Abbey districts (M. H. Stiles).

803. **Cymbella subæqualis** Grun.

S.W.—Cusworth district, Doncaster (M. H. Stiles).

804. **Cymbella delicatula** Kütz.

S.W.—Cusworth district, Doncaster (M. H. Stiles).

805. **Cymbella affinis** Kütz.

S.W.—Marley, near Bingley. Ogden Clough. Crimsworth Dean.

MID W.—Near Buckden. Penyghent. Harrogate.

N.E.—Rievaulx Abbey.

806. **Cymbella gastroides** Kütz.

S.W.—Goole; Roche Abbey Lake (E. Hunter). Askern and Hatfield districts; Firsby Reservoirs (M. H. Stiles). Marley, near Bingley.

MID W.—Baildon. Ribblehead. Ingleton. Simon's Fell (iv. 1892).

807. **Cymbella lanceolata** (Ehrenb.), Kirchn.

[Syn. *Cocconema lanceolatum* Ehrenb.].

S.W.—Cusworth district; Doncaster town water; Firsby reservoirs; Rossington; Hatfield district (M. H. Stiles). Askern (F. H. Allen; J. M. Kirk; M. H. Stiles). Hatfield Chase (J. M. Kirk). Roche Abbey (J. N. Coombe; M. H. Stiles). Nab Wood, near Bingley. Bradford.

MID W.—Birk Crag, Harrogate (G. Norman). Roundhay (W. B. Turner). Baildon. Moughton Fell. Holden Gill, near Keighley. Horton-in-Ribblesdale. Arthington. Malham Tarn Bog. Buckden.

N.E.—Staindale. Hayburn Wyke. Cleave Cliffs, north of Scalby. Carlton Bank, Stokesley.

S.E.—Beverley. Spring Ditch; Wawne; Risby Pond; Newbald; Hornsea Peat Deposit; Driffield (G. Norman).

Var. **Boechii** Ehrenb.; Rabenh. [non *Doryphora Boechii* W. Sm.=*Brebissonia Boechii* (Kütz.) Grun.].

S.W.—Roche Abbey (E. Hunter).

808. **Cymbella cymbiformis** (Kütz.) Bréb.

[Syn. *Cocconema cymbiforme* (Kütz.) Ehrenb.].

S.W.—Woolley. Bradford. Ogden Clough. Roche Abbey (J. N. Coombe; M. H. Stiles). Askern and Cusworth districts; Firsby reservoir; Doncaster town water (M. H. Stiles).

MID W.—Roundhay (W. B. Turner). Baildon. Moughton Fell. Whernside (1900 ft.).

N.W.—Frequent. Great Sleddale.

S.E.—Riccall Common. Beverley. Hull. Spring Ditch; Newsholme Lake (G. Norman).

Var. **parva** (W. Sm.) V. H.

[Syn. *Cocconema parvum* W. Sm.].

S.W.—Askern district; Doncaster town water (M. H. Stiles). Goole; Roche Abbey (E. Hunter). Bradford. Bingley. Denholme.

MID W.—Baildon. Wigton Moor. Holden Gill, near Keighley. Cowside Beck, Arncliffe. Cocket Moss, near Giggleswick.

N.E.—Common. Staindale. Hayburn Wyke. Saltburn.

N.W.—Dodd Fell.

S.E.—Anlaby Road (Dr. Munroe). Hull (G. Norman).

809. **Cymbella Cistula** (Hempr.) Kirchn.

[Syn. *Cocconema Cistula* Hempr.].

S.W.—Bradford. Roche Abbey (J. N. Coombe; M. H. Stiles). Askern, Cusworth, and Hatfield districts; Rossington; Firsby reservoirs and Doncaster town water (M H. Stiles).

MID W.—Rombald's Moor. Moughton Fell. Arthington. Staveley Dam, near Knaresborough. Cowside Beck. Arncliffe. Linn Gill. Whernside.

N.W.—Dodd Fell. Cautley Spout.

N.E.—Common. Staindale.

S.E.—Beverley! Loftsome Bridge, near Wressle. Spring Ditch; Hornsea Peat Deposit; Skirlaugh; Wawne (G. Norman).

Var. **maculata** (Kütz.) Grun.

[Syn. *Cymbella maculata* Kütz.].

S.W.—Firsby reservoir (M. H. Stiles).

MID W.—Boston Spa.

N.W.—Lund's Fell.

S.E.—Ditch, Anlaby to Hessle Road; Beverley; Cottingham; Haltenprice; Reservoir Waterworks (G. Norman).

810. **Cymbella truncata** Rabenh.

MID W.—Esholt.

811. **Cymbella helvetica** Kütz.

MID W.—Ingleton. Shipley Glen. Cowside Beck, Arncliffe. Dropping Well, Knaresborough.

N.E.—Rievaulx Abbey. Saltersgate (G. Norman).

S.E.—Spring Ditch; Market Weighton Canal (G. Norman).

812.—**Cymbella lævis** Näg.

MID W.—Ingleton, on wet rocks, amongst *Cladophora glomerata*.

GENUS ENCYONEMA Kütz., 1834.

813. **Encyonema prostratum** (Berk.) Ralfs.

S.W.—Roche Abbey (J. N. Coombe; M. H. Stiles). Bradford. Firsby reservoirs; Hatfield district (M. H. Stiles).

MID W.—Harrogate (G. Norman). Malham Tarn (H. F Parsons. Moughton Fell. How Hill, Markington (Rev. J. S. Tute!). Ribblehead. Near Otley. Knaresborough. Ingleborough.

N.W.—Muker.

N.E.—Terrington. Ingleby Greenhow.

S.E.—Wawne; Reservoir Waterworks, Hull (G. Norman).

814. **Encyonema turgidum** (Greg.) Grun.

[Syn. *Cymbella turgida* Greg.].

S.W.—Wibsey. Denholme. Liversedge! (Rev. W. Fowler).

MID W.—Bolton Woods. Simon's Fell. Linn Gill. Rombald's Moor.

N.E.—Scalby Beck. Ingleby Greenhow.

815. **Encyonema cæspitosum** Kütz.

S.W.—Bradford. Allerton. Bingley. Mirfield. Roche Abbey (J. N. Coombe; M. H. Stiles). Firsby reservoirs. Rossington; Hatfield district (M. H. Stiles).

MID W.—Birk Crag. Harrogate (G. Norman). Ingleborough. Arthington. Rombald's Moor. Malham Tarn.

N.W.—Cautley Spout. Rombaldkirk. Rokeby.

N.E.—Rievaulx Abbey. Malton.

S.E.—Tickton. Routh. Beverley. Wawne; Hull (G. Norman).

816. **Encyonema ventricosum** (Ag.) Kütz.

[Syn. *Cymbella ventricosa* Ag.].

S.W.—Coley, near Shelf.

MID W.—Ingleton ! (H. F. Parsons); with sporangial valves, ix. 1898. Roundhay (W. B. Turner). Baildon. Ingleborough. Rombald's Moor. Ribblehead. Boston Spa. Harrogate. Moughton Fell.

N.W.—Dodd Fell. Mickle Fell.

S.E.—Routh. Near Sutton. Beverley. Skirlaugh; near Cottingham; Benningholme (G. Norman).

817. **Encyonema gracile** Rabenh.

S.W.—Cullingworth. Cragg Vale, towards Blackstone Edge.

MID W.—Wigton Moor. Kilnsey. Cocket Moss, near Giggleswick.

S.E.—Skipwith Common.

Var. **Scotica** (W. Sm.) Van Heurck.

[Syn. *Cymbella Scotica* W. Sm.].

N.E.—Saltersgate (G. Norman).

S.E.—Cottingham (G. Norman).

FAMILY *NAVICULEÆ*.

GENUS MASTOGLOIA Thw., 1848.

818. **Mastogloia Smithii** Thw.

S.W.—Askern district (M. H. Stiles).

MID W.—Baildon, vii. 1893.

S.E.—Near Stone Ferry (G. Norman).

819. **Mastogloia Dansei** Thw.

S.E.—Outlet, Hornsea Mere (G. Norman).

GENUS STAURONEIS Ehrenb., 1843.

820. **Stauroneis Phoenicenteron** (Nitzsch) Ehrenb.

S.W.—Bradford. Keighley Tarn. Askern, Cusworth, and Hatfield districts (M. H. Stiles).

MID W.—Harrogate (G. Norman). South Milford (W. B. Turner). Malham Tarn. Wigton Moor. Bowland Knotts.

N.E.—Near Scarborough. Seamer. Strensall. Terrington. Pilmoor, near Thirsk. Saltersgate (G. Norman).

N.W.—Jervaulx Abbey.

S.E.—Tickton. Cottingham; Skirlaugh; Risby Pond; Market Weighton; Hornsea Peat Deposit (G. Norman).

821. **Stauroneis gracilis** Ehrenb.

S.W.—Hatfield district (M. H. Stiles). Doncaster.

MID W.—Shipley Glen. Langcliffe, near Settle.

S.E.—Near River Hull; Hornsea Peat Deposit; Spring Ditch; Haltenprice (G. Norman).

822. **Stauroneis acuta** W. Sm.

[Syn. *Pleurostaurum acutum* Rabenh.].

MID W.—Bog at the bottom of Shipley Glen, in abundance (iv. 1895).

N.W.—Great Shunnor Fell.

S.E.—Hornsea Peat Deposit; Risby Pond (G. Norman).

823. **Stauroneis salina** W. Sm.

S.E.—In brackish water, near Stoneferry; outlet, Hornsea Mere; ditch near River Hull (G. Norman).

824. **Stauroneis anceps** Ehrenb.

S.W.—Roche Abbey (J. N. Coombe; M. H. Stiles). Doncaster town water; Hatfield district (M. H. Stiles). Halifax.

MID W.—Baildon. Adel. Wigton Moor. Malham Tarn.

N.W.—Mickle Fell. Jervaulx Abbey.

N.E—Whitby. Strensall. River Derwent at Forge Valley.

S.E. — Routh. Tickton. Spring Ditch; Cottingham; Beverley; Wawne; Haltenprice; Hornsea Peat Deposit (G. Norman).

Var. **linearis** (Kütz.) Van Heurck.

[Syn. *Stauroneis linearis* Kütz.].

N.W.—Jervaulx Abbey.

825. **Stauroneis Legumen** Ehrenb. [Syn. *Pleurostaurum Legumen* Rabenh.; *Stauroneis Smithii* Grun.; *S. linearis* W. Sm.].

S.W.—Rossington (M. H. Stiles). Marley, near Bingley. Shipley.

MID W.—Killinghall (G. Norman). Baildon.

S.E.—Beverley; Cottingham; Market Weighton Canal (G. Norman).

GENUS NAVICULA Bory (1822).

826. **Navicula nobilis** (Ehrenb.) Kütz.

[Syn. *Pinnularia nobilis* Ehrenb.].

S.W.—Askern district (M. H. Stiles). Marley, near Bingley. Cullingworth. Hatfield Chase (J. M. Kirk). Doncaster.

MID W.—Austwick. Baildon. Rombald's Moor. Eldwick. Moughton Fell. Cocket Moss, near Giggleswick.

N.W.—Mickle and Cronkley Fells.

N.E.—Strensall. Pilmoor, near Thirsk. Terrington. Seamer.

S.E.—Beverley. Cottingham; Hornsea Peat Deposit (G. Norman).

Var. **Dactylus** (Ehrenb.) V.H.

[Syn. *Pinnularia Dactylus* Ehrenb.].

MID W.—Wigton Moor.

N.W.—Mickle Fell. Great Shunnor Fell.

827. **Navicula major** Kütz.

[Syn. *Pinnulara major* (Kütz.) Rabenh.].

S.W.—Askern, Cusworth, and Hatfield districts; Firsby Reservoirs (M. H. Stiles). Bradford. Swill Hill. Ogden Clough. Keighley Moor. Doncaster.

MID W.—Baildon. Eldwick. Harrogate (G. Norman). Malham Tarn. Wigton Moor. Ilkley. Bolton Woods. Boston Spa. Black Hill, near Settle. Bog two miles south of Clapham.

N.W.—Great Sleddale. Jervaulx Abbey. Bog near Widdale Beck. Cronkley Fell. Mickle Fell.

N.E.—Pilmoor, near Thirsk. Carlton Bank. Stokesley. Strensall. Seamer. Levisham.

S.E.—Market Weighton!; Hornsea Peat Deposit; Spring Ditch (G. Norman).

828. **Navicula viridis** Kütz.

[Syn. *Pinnularia viridis* (Ehrenb.) Rabenh.].

S.W.—Askern, Cusworth, and Hatfield districts; Firsby Reservoirs; Rossington; Doncaster (!) town water (M. H. Stiles). Cragg Vale, towards Blackstone Edge. Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe). Greetland, near Halifax. Bradford. Oxenhope. Keighley Moor.

MID W.—Harrogate (G. Norman). South Milford (W. B. Turner). Ilkley. Kildwick. Malham Tarn. Leathley. Black Hill, near Settle. Cowgill Wold Moss, Widdale Fell. Boston Spa. Horsforth. Bowland Knotts (pure gathering). Bog two miles south of Clapham. Whernside. Penyghent. Ribblehead.

N.W. — Penhill Beacon. Bog near Widdale Beck (with auxospores). Jervaulx Abbey. Mickle Fell. Baugh Fell.

N.E.—Saltburn. Saltersgate (G. Norman).

S.E. — Beverley. Loftsome Bridge, near Wressle. Near Meaux Abbey. Tickton. Near Sutton. Newsholme. Skipwith Common (Rev. W. Fowler!) Market Weighton. Cottingham; Spring Ditch; Skirlaugh; Driffield; Haltenprice; Hornsea Peat Deposit; reservoir waterworks, Hull (G. Norman).

Var. **commutata** Grun.

[Syn. *Navicula hemiptera* auct. nec Kütz.].

S.W.—Askern district; Doncaster town water (M. H. Stiles).

829. **Navicula hemiptera** Kütz.

N.E.—Rocky stream, Saltersgate (G. Norman).

830. **Navicula cardinalis** Ehrenb.

[Syn. *Pinnularia cardinalis* Ehrenb.].

S.W.—Doncaster.

MID W.—Adel Bog. Baildon.

N.W.—Cronkley Fell.

S.E.—Hornsea Peat Deposit (G. Norman).

831. **Navicula lata** Bréb.

[Syn. *Pinnularia lata* (Bréb.) Rabenh.]. Rare.

MID W.—Blubberhouses (W. B. Turner). Appletreewick. Malham Tarn. Near Buckden.

N.W.—Mickle Fell. Great Shunnor Fell. Great Sleddale. Snaizeholme Fell.

N.E.—Moorland stream, near Scarborough.

832. **Navicula alpina** (W. Sm.) Ralfs.
[Syn. *Pinnularia alpina* W. Sm.].

Rare.

S.W.—Cullingworth. Keighley Moor (iv. 1897).

N.W.—Mickle Fell. Bog near Widdale Beck.

833. **Navicula borealis** (Ehrenb.) Kütz.
[Syn. *Pinnularia borealis* Ehrenb.].

MID W.—Bolton Woods. Ingleton.

N.E.—Carlton Bank.

S.E.—Benningholme; Market Weighton Canal (G. Norman).

834. **Navicula Rabenhorstii** (Ralfs) Grun. [Syn. *Pinnularia Rabenhorstii* Ralfs; *P. interrupta* Rabenh.].

S.W.—Marley, near Bingley.

MID W.—Harrogate (G. Norman).

N.W.—Cronkley Fell. Great Shunnor Fell.

N.E.—Levisham. Glaisedale.

S.E.—Risby Pond; Wawne (G. Norman).

835. **Navicula divergens** (W. Sm.) Ralfs.
[Syn. *Pinnularia divergens* W. Sm.].

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Carlton Bank. Seamer.

S.E.—Cottingham (G. Norman).

836. **Navicula Hilseana** Janisch.

S.W.—Cragg Vale, towards Blackstone Edge.

MID W.—Near Buckden. Bog two miles south of Clapham.

N.W.—Mickle Fell.

837. **Navicula Brebissonii** Kütz. [Syn. *Pinuularia Brebissonii* (Kütz.) Rabenh.; *Pinnularia stauroneiformis* W. Sm.].

S.W.—Manningham Park, Bradford. Cullingworth. Keighley Tarn. Cragg Vale, towards Blackstone Edge.

MID W.—Adel Bog. Eldwick. Wigton Moor. Earl's Seat. Whernside. Cocket Moss, near Giggleswick. Bolton Woods. Bog two miles south of Clapham. Penyghent. Harrogate (G. Norman).

N.W.—Mickle Fell. Penhill Beacon. Near Keld. Cronkley Fell. Up to 2200 ft. in Swaledale. Bog near Widdale Beck.

N.E.—Carlton. Lockton. Cleava Cliffs, north of Scalby. Terrington.

S.E.—Tickton. Near Meaux Abbey. Beverley. Skipwith Common (Rev. W. Fowler!). Cottingham; Spring Ditch; Skirlaugh; Reservoir waterworks, Hull (G. Norman).

838. **Navicula Tabellaria** (Ehrenb.) Kütz.

[Syn. *Pinnularia Tabellaria* Ehrenb.].

MID W.—Eldwick. Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.W.—Great Shunnor Fell.

N.E.—Lockton. Saltersgate (G. Norman).

Var. **acrosphæria** Rabenh.

[Syn. *Pinnularia acrosphæria* Rabenh.].

MID W.—Eldwick.

N.W.—Birkdale Tarn Moss.

N.E.—Terrington.

S.E.—Peat Deposit, Filey.

839. **Navicula gibba** (Ehrenb.) Kütz.

[Syn. *Pinnularia gibba* Ehrenb.].

S.W.—Cullingworth.

MID W.—Boston Spa. Wigton Moor. Eldwick. Horsforth.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Great Sleddale.

N.E.—Lockton. Terrington. Pilmoor, near Thirsk. Saltersgate (G. Norman).

S.E.—Risby Pond; Haltenprice; Cottingham (G. Norman).

840. **Navicula bicapitata** Lagerstedt.

S.W.—Cullingworth.

MID W.—Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

841. **Navicula appendiculata** (Ag.) Kütz.

S.W.—Shipley. Cragg Vale, towards Blackstone Edge.

MID W.—Linn Gill. Cocket Moss, near Giggleswick. Bowland Knotts. Giggleswick Common.

N.W.—Bog near Widdale Beck.

N.E.—Carlton Bank. Near Scarborough.

S.E.—Newsholme.

842. **Navicula mesolepta** Ehrenb.

[Syn. *Pinnularia mesolepta* W. Sm.].

S.W.—Marley, near Bingley. Cullingworth. Farnley. Cragg Vale, towards Blackstone Edge. Near Shipley.

MID W.—Harrogate (G. Norman). Boston Spa. Whernside. Ribblehead.

N.W.—Mickle Fell.

N.E.—Near Scarborough. Terrington. Saltersgate (G. Norman.

S.E.—Tickton. Beverley. Near Meaux Abbey. Haltenprice; Hornsea Peat deposit; Beverley Parks (G. Norman).

843.—**Navicula Legumen** Ehrenb.

S.W.—Firsby reservoirs and Doncaster town water (M. H. Stiles).

844. **Navicula oblonga** Kütz.

[Syn. *Pinnularia oblonga* (Kütz.) Rabenh.].

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles). Roche Abbey (M. H. Stiles; J. N. Coombe). Doncaster. Bradford. Bingley.

MID W.—Baildon. Adel. Harrogate; Malham Cove (J. M. Kirk).

N.W.—Jervaulx Abbey.

N.E.—Strensall. Seamer.

S.E.—Wressle. Cottingham; Spring Ditch; Skirlaugh; Hornsea Peat Deposit (G. Norman).

845. **Navicula peregrina** (Ehrenb.) Kütz.

[Syn. *Pinnularia peregrina* Ehrenb.].

S.W.—Hatfield district; Rossington (M. H. Stiles). Goole. Coley, near Shelf. Allerton.

S.E.—Tickton. Newsholme, near Howden. Stoneferry (G. Norman).

Var. **menisculus** Schum.

MID W.—Linn Gill. Hawksworth Springs.

N.W.—Mickle Fell.

N.E.—Ingleby Greenhow.

846. **Navicula gracilis** Kütz.

S.W.—Cusworth district; Firsby reservoirs; Roche Abbey (M. H. Stiles). Shipley Glen.

MID W.—Penyghent. Moughton Fell.

N.E.—Ingleby Greenhow. Saltersgate (G. Norman).

S.E.—Spring Ditch; Marfleet; Ditch near River Hull (G. Norman).

Var. **neglectum** (Thw.). [Syn. *Schizonema neglectum* (Thw.) Rabenh.; *Colletonema neglectum* Thw.; *Navicula gracilis* Kütz. var. *schizonemoides* V.H.].

S.W.—Roche Abbey (M. H. Stiles; J. N. Coombe).

MID W.—Ingleton. Shipley Glen. Ribblehead.

S.E.—Hull; Wawne (G. Norman).

847. **Navicula acuminata** (W. Sm.).

[Syn. *Pinnularia acuminata* W. Sm.].

MID W.—Adel Bog.

N.W.—Cronkley Fell.

N.E.—Scarborough Mere.

848. **Navicula viridula** Kütz.

[Syn. *Pinnularia viridula* (Kütz.) Rabenh.].

S.W.—Roche Abbey (J. N. Coombe; M. H. Stiles). Askern and Cusworth districts (M. H. Stiles).

MID W.—Killinghall (G. Norman).

N.W.—Mickle Fell. Dodd Fell.

S.E. — Tickton. Wawne; Cottingham; Stoneferry (G. Norman).

849. **Navicula radiosa** Kütz.

[Syn. *Pinnularia radiosa* (Kütz.) Rabenh.].

S.W.—Askern, Cusworth and Hatfield districts; Rossington; Doncaster (!) town water and Firsby reservoirs (M. H. Stiles). Morley. Elslack. Mirfield. Greetland, near Halifax. Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe). Denholme.

MID W.—Baildon. South Milford (W. B. Turner). Harrogate (G. Norman). Malham Tarn. Moughton Fell. Adel. Above Eldwick. Holden Gill, near Keighley. Otley. Bolton Woods. Knaresborough. Boston Spa. Crook Gill, one mile from Buckden.

N.W.—Cautley Spout. Jervaulx Abbey. Great Shunnor Fell.

N.E.—Strensall! (W. B. Turner). Pilmoor, near Thirsk. Scarborough Mere. Scalby Beck. Hayburn Wyke. River Derwent at Forge Valley. Staindale. Ingleby Greenhow.

S.E.—Beverley. Tickton. Near Meaux Abbey. Routh. Waghen. Newsholme, near Howden. Riccall Common. Market Weighton. Cottingham; River Hull; Haltenprice; Hornsea Peat Deposit; Reservoir Waterworks, Hull (G. Norman).

Var. **acuta** (W. Sm.) V. H.

[Syn. *Pinnularia acuta* W. Sm.].

S.W.—Roche Abbey (M. H. Stiles; J. N. Coombe). Cusworth district (M. H. Stiles). Near Shipley.

MID W.—Malham Tarn Bog. Penyghent.

N.W.—Mickle Fell.

N.E.—Strensall. Near Scarborough.

S.E.—Cottingham; Skirlaugh; Risby Pond; Driffield; Wawne; Market Weighton Canal; Spring Ditch; Beverley (G. Norman).

Var. **silesiaca** (Bleisch). [Syn. *Pinnularia radiosa* var. *silesiaca* (Bleisch) Rabenh.].

S.E.—Beverley.

850. **Navicula cryptocephala** Kütz.

S.W.—Bradford. Cullingworth. Roche Abbey (J. N. Coombe; M. H. Stiles).

MID W.—Wigton Moor. Moughton Fell. Baildon. Kildwick.

N.W.—Jervaulx Abbey. Dodd Fell.

N.E.—Carlton Bank. Saltburn.

S.E.—Tickton. Waghen. Newsholme, near Howden. River Hull; Market Weighton Canal; Dairycoats (G. Norman).

Var. **veneta** (Kütz.) V. H. [Syn. *Navicula veneta* Kütz.].

S.W.—Cullingworth.

MID W.—Shipley Glen. Boston Spa.

N.E.—Pilmoor, near Thirsk.

S.E.—Newsholme. Market Weighton.

851. **Navicula angustata** W. Sm.

S.W.—Doncaster. Greetland, near Halifax. Chellow Dean. Bingley. Worth Valley, near Keighley. Thorne Moor (G. Norman). Crimsworth Dean. Ogden Clough.

MID W.—Dropping Well, Knaresborough. Moughton Fell. Holden Gill, near Keighley.

N.W.—Mickle Fell. Cautley Spout.

N.E.—Scarborough Mere.

S.E.—Near Meaux Abbey. Beverley. Tickton. Waghen. Newsholme.

852. **Navicula rhynchocephala** Kütz.

S.W.—Greetland, near Halifax. Chellow Dean. Cullingworth. Doncaster town water (M. H. Stiles). Goole; Roche Abbey (E. Hunter). Marley, near Bingley.

MID W.—Harrogate (G. Norman). Pond at Horsforth. Hawksworth Springs.

N.W.—Reeth.

S.E.—Loftsome Bridge, near Wressle. Beverley. Waghen. Tickton. Near Meaux Abbey. Market Weighton. Cottingham; Risby Pond; Haltenprice; Market Weighton Canal (G. Norman).

853. **Navicula Dirhyncus** Ehrenb.

S.W.—Morley.

Mid W.—Adel Bog. Malham Tarn.

S.E.—Near Sutton. Routh. Beverley.

854. **Navicula humilis** Donk.

[Syn. *Navicula inflata* W. Sm., non Kütz.].

S.W.—Hatfield district; Rossington (M. H. Stiles). Allerton. Cullingworth. Roche Abbey (J. N. Coombe).

Mid W.—Hawksworth Springs. Holden Gill, near Keighley. Boston Spa. Killinghall (G. Norman). Kildwick.

N.W.—Mickle Fell.

N.E.—Saltburn. Carlton Bank.

S.E.—Waghen. Tickton. Beverley. Wawne; Market Weighton Canal; Beverley Parks; Cottingham (G. Norman).

855. **Navicula nana** Greg.

[Syn. *Pinnularia pygmæa* Ehrenb.].

S.E.—River Hull; Cottingham; near Stoneferry (G. Norman).

856. **Navicula digitato-radiata** Greg.

Var. **Cyprinus** (W. Sm.) V.H.

[Syn. *Navicula Cyprinus* W. Sm.].

S.E.—Dairycoats; ditch near River Hull (G. Norman).

857. **Navicula Reinhardtii** Grun.

S.W.—Hatfield district (M. H. Stiles).

Mid W.—In River Skell, Fountains Abbey (G. Stuart; E. Grove). Ribblehead.

858. **Navicula lanceolata** Kütz.

S.W.—Cusworth District (M. H. Stiles). Bradford. Cullingworth.

Mid W.—Kildwick.

S.E.—Beverley Parks, near Woodmancy (G. Norman).

859. **Navicula Gastrum** (Ehrenb.) Donk.

Mid W.—Cocket Moss, near Giggleswick.

860. **Navicula tumida** W. Sm., 1853.

[Syn. *Navicula anglica* Ralfs, 1861].

S.W.—Roche Abbey (M. H. Stiles).

Mid W.—Shipley. Hawksworth Springs.

N.W.—Reeth.

N.E.—Seamer. Saltburn.

S.E.—Loftsome Bridge, near Wressle. Cottingham (G. Norman).

861. **Navicula Semen** Ehrenb.

S.W.—Hatfield district (M. H. Stiles).

S.E.—Cottingham; Hornsea Peat deposit; Risby Pond (G. Norman).

862. **Navicula dicephala** Ehrenb.

S.W.—Doncaster town water (M. H. Stiles). Halifax. Allerton. Marley, near Bingley. Ogden Clough. Cragg Vale, towards Blackstone Edge.

Mid W.—Whernside. Malham Tarn Bog. Bowland Knotts. Hawksworth Springs. Near Buckden. Kildwick.

N.W.—Mickle Fell. Great Shunnor Fell. Dodd Fell (in great abundance in stream at 1500 ft.). Muker. Bog near Widdale Beck. Snaizeholme Beck.

N.E.—Goathland.

S.E.—Near Meaux Abbey. Beverley. Routh. Waghen. Tickton. Cottingham; Haltenprice (G. Norman).

863. **Navicula gracillima** Ralfs.

[Syn. *Pinnularia gracillima* Greg.].

N.E.—Rocky stream, Saltersgate (G. Norman).

864. **Navicula Smithii** Bréb.

S.E.—Ditch near River Hull (G. Norman).

865. **Navicula elliptica** Kütz. [Syn. *N. ovalis* W. Sm.].

S.W.—Chellow Dean. Marley, near Bingley. Cullingworth. Roche Abbey (M. H. Stiles; J. N. Coombe). Ogden Clough. Askern, Cusworth and Hatfield districts; Firsby reservoirs (M. H. Stiles).

Mid W.—Baildon. Penyghent. Near Buckden. South of Cray Moss. Moughton Fell. Markington (Rev. J. S. Tute!).

N.W.—Sedbergh. Mickle Fell. Dodd Fell.

N.E.—Seamer. Moist ground, Whitenab, Scarborough. Beast Cliff. Staindale. Carlton Bank.

S.E.—Market Weighton. Hornsea Peat deposit; Haltenprice; River Hull and Reservoir Waterworks, Hull; Newbald; Cottingham (G. Norman).

Var. **ovalis** Hilse.

S.W.—Cusworth district; Doncaster town water (M. H. Stiles).

866. **Navicula pygmæa** Kütz.

[Syn. *Navicula minutula* W. Sm.].

S.W.—Cullingworth. Cusworth near Doncaster! (M. H. Stiles).

S.E.—Stoneferry; ditch near River Hull (G. Norman).

867. **Navicula mutica** Kütz.

S.W.—Thorne Moor (G. Norman). Cullingworth.

868. **Navicula crucicula** (W. Sm.) V. H. [Syn. *Stauroneis crucicula* W. Sm.; *S. dilatata* W. Sm.].

S.E.—Ditch near River Hull; in brackish water (G. Norman).

869. **Navicula integra** W. Sm.

Mid W.—Hawksworth Springs.

870. **Navicula scita** W. Sm.

S.E.—Newbald; Cottingham (G. Norman).

871. **Navicula elegans** W. Sm.

S.E.—Near Stoneferry (G. Norman).

872. **Navicula latissima** Greg.

S.W.—Roche Abbey (E. Hunter).

873. **Navicula granulata** Bréb. MS. Var. **maculosa** (Donk.) V.H. [Syn. *Navicula maculosa* Donk.].

S.W.—Rossington (M. H. Stiles).

874. **Navicula tumens** W. Sm.

S.E.—Near Stoneferry (G. Norman).

875. **Navicula lepida** Greg.

S.E.—Very rare in fresh water, Spring Ditch (G. Norman).

876. **Navicula pusilla** W. Sm.

[Syn. *Navicula gastroides* Greg.].

MID W.—Hawksworth Springs, near Shipley.

N.E.—Whitby.

S.E.—Tickton. Routh. Beverley. Near Meaux Abbey. Waghen. Near Stoneferry; Wawne; Market Weighton Canal; Cottingham (G. Norman).

877. **Navicula Trochus** Ehrenb.

MID W.—In River Skell, Fountains Abbey (G. Stuart; E. Grove).

878. **Navicula cuspidata** Kütz.

S.W.—Askern, Cusworth, and Hatfield districts; Firsby reservoirs; Rossington (M. H. Stiles). Hatfield Chase (J. M. Kirk). Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe). Elslack.

MID W.—Roundhay; South Milford; Blubberhouses (W. B. Turner). Harrogate (G. Norman). Baildon. Moughton Fell. Pond at Pool. Pond at Horsforth. Boston Spa.

N.W.—Great Shunnor Fell.

N.E.—Scarborough Mere. Carlton Bank. Seamer. Malton.

S.E.—Riccall Common. Skipwith Common. Market Weighton. Loftsome Bridge, near Wressle. Wressle. Cottingham; Hornsea Mere and Hornsea Peat Deposit; Risby Pond; Spring Ditch; Stepney; Haltenprice (G. Norman).

879. **Navicula ambigua** Ehrenb.

S.W.—Rossington; Firsby Reservoirs (M. H. Stiles).

N.E.—Strensall.

S.E.—Market Weighton. Wressle. Stoneferry; Hornsea Peat Deposit (G. Norman).

880. **Navicula sculpta** Ehrenb.

S.W.—Askern district (M. H. Stiles).

881. **Navicula sphærophora** Kütz.

S.W.—Doncaster.

S.E.—Near Meaux Abbey. Beverley. Wressle. Haltenprice; Hornsea Peat Deposit (G. Norman).

882. **Navicula serians** (Bréb.) Kütz.

S.W.—Hatfield district (M. H. Stiles). Cullingworth.

N.W.—Mickle Fell.

N.E.—Strensall.

883. **Navicula garganica** Rabenh.

MID W.—Harrogate (G. Norman).

S.E.—Cottingham; ditch near River Hull; Anlaby to Hessle Road (G. Norman).

884. **Navicula exilis** (Kütz.) Grun.

S.W.—Askern and Hatfield districts; Firsby Reservoirs; Doncaster (!) town water; Rossington (M. H. Stiles). Woolley. Cullingworth. Keighley. Liversedge (Rev. W. Fowler!) Coley, near Shelf. Hebden Bridge.

MID W.—Baildon. Boston Spa. Horton-in-Ribblesdale.

N.E.—Cornelian Bay. Saltburn. Terrington.

S.E.—Near Meaux Abbey. Beverley. Routh. Waghen. Tickton. Loftsome Bridge, near Wressle. Newsholme.

885. **Navicula follis** Ehrenb.

S.E.—Market Weighton Canal; Beverley Parks (G. Norman).

886. **Navicula latiuscula** Kütz.

S.W.—Hatfield district (M. H. Stiles).

887. **Navicula Amphisbœna** Bory.

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles). Near Doncaster. Goole; Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe). Shipley. Near Bingley.

MID W.—Harrogate; Ripley (G. Norman). Adel. Arthington.

N.E. — Whitby. Marske. Scarborough Mere. Seamer. Strensall.

S.E.—Waghen. Beverley. Loftsome Bridge, near Wressle. Near Stoneferry; Cottingham; Haltenprice; Market Weighton Canal (G. Norman).

888. **Navicula limosa** Kütz.

S.W.—Cusworth, near Doncaster. Askern and Hatfield districts; Firsby reservoirs; Roche Abbey; Rossington (M. H. Stiles).

MID W.—Cocket Moss, near Giggleswick. Hawksworth Springs. Ingleton.

N.W.—Mickle and Cronkley Fells.

N.E.—Carlton Bank.

S.E.—Beverley. Market Weighton. River Hull near Wawne ; Cottingham (G. Norman).

Var. **gibberula** (Kütz.) V.H. [Syn. *N. gibberula* Kütz.].

S.W.—Marley, near Bingley. Roche Abbey (J. N. Coombe).

MID W.—Baildon. Eldwick.

N.W.—Mickle Fell.

N.E.—Staindale. Hayburn Wyke.

S.E.—Risby Pond; Skirlaugh; Cottingham; Hornsea Mere and Peat deposit; near Stoneferry; Wawne; Haltenprice; Spring Ditch; Market Weighton Canal (G. Norman).

889. **Navicula ventricosa** (Ehrenb. ?) Donkin.

MID W.—Baildon.

890. **Navicula Iridis** Ehrenb. [Syn. *N. firma* W. Sm.].

S.W.—Askern district and Roche Abbey (M. H. Stiles).

MID W.—Bog two miles south of Clapham.

S.E.—Risby Pond; Cottingham; Haltenprice; Spring Ditch (G. Norman).

Var. **Amphigomphus** (Ehrenb.) V. H.

[Syn. *Navicula Amphigomphus* Ehrenb.].

S.W.—Shipley.

MID W.—Harrogate (G. Norman). Langcliffe near Settle. Bog two miles south of Clapham.

N.E.—Near Scarborough.

S.E.—Skipwith Common. Cottingham; Wawne (G. Norman).

Var. **Amphirhyncus** (Ehrenb.) De Toni.

[Syn. *Navicula Amphirhyncus* Ehrenb.].

S.W.—Hatfield district; Rossington (M. H. Stiles). Goole; Roche Abbey (E. Hunter). Cullingworth.

MID W.—Roundhay (Abbott, Emsley, and Turner). Harrogate (G. Norman). Adel Bog. Eldwick. Ilkley. Hawksworth Springs. Malham Tarn. Bowland Knotts.

N.W.—Mickle Fell.

N.E.—Seamer. Strensall (W. B. Turner).

S.E.—Beverley. Cottingham; Skirlaugh (G. Norman).

Var. **affinis** (Ehrenb.). V. H.

[Syn. *Navicula affinis* Ehrenb.].

S.W.—Goole (J. Harrison). Roche Abbey (M. H.. Stiles; J. N. Coombe). Chellow Dean. Bradford. Cullingworth. Keighley Moor.

Mid W.—Adel Bog. Rombald's Moor. Holden Gill, near Keighley. Moughton Fell.

N.E.—'Common.' Cornelian Bay. Saltburn. Carlton Bank.

S.E.—Market Weighton. Spring Ditch; Cottingham (G. Norman).

Var. **producta** (W. Sm.) V. H.

[Syn. *Navicula producta* W. Sm.].

S.W.—Roche Abbey (M. H. Stiles; J. N. Coombe).

Mid W.—Boston Spa.

N.E.—Marske. Strensall. Pilmoor, near Thirsk.

S.E.—Loftsome Bridge, near Wressle. Skirlaugh; Cottingham; Haltenprice; Hornsea Peat deposit (G. Norman).

891. **Navicula bacillum** Ehrenb.

[Syn. *N. bacillaris* Greg.].

S.E.—Hornsea Peat deposit; Cottingham (G. Norman).

892.—**Navicula lævissima** (Kütz. ?) Grun.

N.E.—Saltersgate (G. Norman).

S.E.—Cottingham; Hornsea Peat deposit; Haltenprice; Wawne (G. Norman).

893. **Navicula Pupula** Kütz.

S.W.—Ogden Clough. Near Bingley.

Mid W.—Baildon. Harrogate. Linn Gill. Hawksworth Springs. Moughton Fell.

S.E.—Wressle.

894. **Navicula binodis** (Ehrenb.) W. Sm.

Mid W.—Baildon. Hawksworth Springs. Rombald's Moor.

N.W.—Mickle Fell.

N.E.—Staithes.

S.E.—Beverley; Market Weighton Canal (G. Norman).

895. **Navicula Gallica** (W. Sm.) V.H.
[Syn. *Diadesmis Gallica* W. Sm.].

MID W.—Near Knaresborough. Wigton Moor. Malham Tarn Bog.

N.E.—Pilmoor, near Thirsk. Terrington.

GENUS COLLETONEMA (Bréb., 1849) V.H.

896. **Colletonema lacustre** (Ag.) V.H.
[Syn. *Schizonema lacustre* Ag.].

S.W.—Hatfield district (M. H. Stiles).

GENUS VANHEURCKIA Bréb., 1868.

897. **Vanheurckia rhomboides** (Ehrenb.) Bréb. [Syn. *Navicula rhomboides* Ehrenb.; *Frustulia rhomboides* (Ehrenb.) De Toni].

Frequent in sphagnum bogs and peat bogs generally, sometimes occurring in pure gelatinous masses.

S.W.—Thorne Moor (G. Norman). Greetland, near Halifax. Morley. Near Bradford. Cullingworth. Keighley Tarn.

MID W.—Milford; Blubberhouses (W. B. Turner). Baildon. Moughton Fell. Near Buckden. Ribblehead. Bowland Knotts.

N.W.—Baugh Fell. Penhill Beacon. Lund's Fell. Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Carlton Bank.

S.E.—Skipwith Common (Rev. W. Fowler!).

Var. **saxonica** (Rabenh.). [Syn. *Frustulia saxonica* Rabenh., 1851; *Navicula crassinervia* Bréb., 1852; *Vanheurckia rhomboides* var. *crassinervia* V.H.].

S.W.—Askern (J. M. Kirk). Cullingworth. Ogden Clough. Cragg Vale, towards Blackstone Edge.

MID W.—Adel Bog. Whernside. Cocket Moss, near Giggleswick. Near Buckden.

N.W.—Mickle Fell. Cronkley Fell. Bog near Widdale Beck. Snaizeholme Beck. Dodd Fell. Cowgill Wold Moss, Widdale Fell.

N.E.—Carlton Bank. Saltersgate (G. Norman).

S.E.—Beverley. Waghen. Cottingham; River Hull (G. Norman).

898. **Vanheurckia vulgaris** (Thw.) V.H.

[Syn. *Colletonema vulgaris* Thw.].

S.W.—Marley, near Bingley.

MID W.—Rombald's Moor. Ribblehead.

Hawksworth Springs (near Shipley).

S.E.—Market Weighton. Cottingham (G. Norman).

N.E.—Carlton Bank.

GENUS AMPHIPLEURA Kütz., 1844.

899. **Amphipleura pellucida** Kütz.

S.W.—Near Doncaster. Askern and Hatfield districts; Roche Abbey (M. H. Stiles). Cullingworth.

MID W.—Roundhay (J. Abbott). Staveley Dam, near Knaresborough. Shipley Glen. South of Cray Moss.

N.W.—Jervaulx Abbey. Mickle Fell.

N.E.—Scarborough Mere. Pilmoor, near Thirsk. Ingleby Greenhow.

S.E.—Skipwith Common (Rev. W. Fowler!). Cottingham; Risby Pond; Botanic Gardens, Hull (G. Norman).

GENUS SCOLIOPLEURA Grun., 1860.

900. **Scoliopleura Westii** (W. Sm.) Grun.

[Syn. *Navicula Westii* W. Sm.].

S.E.—In brackish water, River Hull (G. Norman).

GENUS PLEUROSIGMA W. Sm., 1853.

901. **Pleurosigma attenuatum** (Kütz.) W. Sm.

S.W.—Askern, Cusworth, and Hatfield districts;, Doncaster town water; Firsby Reservoirs (M. H. Stiles). Bradford. Marley, near Bingley. Goole; Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe).

MID W.—Baildon. South Milford (W. B. Turner). Staveley Dam, near Knaresborough.

N.W.—Rokeby.

N.E.—Rievaulx Abbey. Carlton Bank. Stokesley.

S.E.—Beverley. Spring Ditch; Haltenprice; Cottingham; Newbald; Risby Pond; Hornsea Peat Deposit; Wawne; Reservoir Waterworks, Hull (G. Norman).

Var. **scalprum** (Gaill.) Grun.

S.W.—Hatfield district (M. H. Stiles).

902. **Pleurosigma acuminatum** (Kütz.) Grun.

[Syn. *Pleurosigma lacustre* W. Sm.].

S.W.—Bradford. Chellow Dean. Askern (M. H. Stiles; F. H. Allen). Roche Abbey (E. Hunter; M. H. Stiles; J. N. Coombe). Doncaster.

MID W.—Baildon. Malham Tarn. Harrogate (G. Norman). Roundhay (W. B. Turner). Adel. Arthington. Horsforth. Ripley (G. Norman). Boston Spa. Hawksworth Springs.

N.E.—Seamer. Scarborough Mere. Cornelian Bay. Saltburn.

S.E.—Hornsea Mere. Tickton. Beverley! Waghen. Loftsome Bridge, near Wressle. Newsholme. Skipwith Common. Cottingham; River Hull; Risby Pond; Market Weighton; Haltenprice; Hornsea Peat Deposit (G. Norman).

903. **Pleurosigma Spencerii** (Quekett) W. Sm.

S.W.—Cusworth and Hatfield districts; Firsby Reservoirs (M. H. Stiles). Roche Abbey (J. Newton Coombe). Goole (E. Hunter). Doncaster. Fixby. Bradford.

MID W.—South Milford (W. B. Turner). Leathley.

N.W.—Mickle Fell. Reeth.

N.E.—Seamer. Strensall. Hayburn Wyke. River Derwent, Forge Valley. Saltburn. Carlton Bank.

S.E.—Beverley. Routh. Skipwith Common. Market Weighton. Spring Ditch; Hornsea Mere; Wawne; Risby Pond; Hornsea Peat Deposit; Haltenprice (G. Norman).

904. **Pleurosigma scalproides** Rabenh.

S.W.—Hatfield district (M. H. Stiles).

MID W.—Amongst *Cladophora glomerata* in stream, Ingleton.

GENUS AMPHIPRORA (Ehrenb.) Cleve, 1891.

905. **Amphiprora alata** Kütz.

S.E.—Near Stoneferry (G. Norman).

906. **Amphiprora paludosa** W. Sm.

S.E.—Stoneferry to Sutton; ditch, near River Hull; Anlaby Road to Hessle Road (G. Norman).

907. **Amphiprora constricta** Ehrenb.

S.E.—Dairycoates; pure near Marfleet (G. Norman).

FAMILY *GOMPHONEMEÆ*.

GENUS GOMPHONEMA Ag., 1824.

908. **Gomphonema geminatum** (Lyngb.) Ag.

S.W.—Askern district (M. H. Stiles).

MID W.—Roundhay (W. B. Turner). Leathley. Moughton Fell. Ribblehead. Bolton Woods. Buckden. Oughtershaw Moss.

N.W.—Cautley Spout. Upper Teesdale. Dodd Fell, waterfall in Gill.

N.E.—Strensall (W. B. Turner).

909. **Gomphonema constrictum** Ehrenb.

S.W.—Askern and Hatfield districts; Doncaster (!) town water; Rossington; Firsby Reservoirs (M. H. Stiles). Roche Abbey (M. H. Stiles; J. N. Coombe). Woolley. Heaton.

MID W.—Harrogate! (G. Norman). Holden Gill, near Keighley. Shipley Glen. Adel. Boston Spa. Staveley Dam, near Knaresborough. Linn Gill. Buckden.

N.W.—Jervaulx Abbey. Sedbergh.

N.E.—Whitby. Staithes. Scarborough Mere. Scalby Beck. Malton.

S.E.—Loftsome Bridge, near Wressle. Newsholme. Wawne; Cottingham; Hornsea Peat deposit; Market Weighton Canal (G. Norman).

Var. **capitatum** (Ehrenb.) V.H.

[Syn. *Gomphonema capitatum* Ehrenb.]

S.W.—Doncaster town water; Hatfield district (M. H. Stiles). Near Mirfield. Bradford. Cullingworth. Bingley.

MID W.—Malham Tarn. Boston Spa. Baildon. Ribblehead.

N.W.—Cronkley Fell. Great Shunnor Fell. Dodd Fell. Sedbergh.

N.E.—Seamer. Terrington.

S.E.—Loftsome Bridge, near Wressle. Cottingham; Hornsea deposit (G. Norman). Anlaby Road (Dr. Munroe).

910. **Gomphonema acuminatum** Ehrenb.

S.W.—Askern, Cusworth, and Hatfield districts; Firsby reservoirs; Doncaster (!) town water; Rossington (M. H. Stiles). Goole; Roche Abbey (E. Hunter). Askern; Hatfield Chase (J. M. Kirk). Denholme.

MID W.—Wigton Moor. Roundhay (W. B. Turner). Markington (Rev. J. S. Tute!). Baildon. Bolton Woods. Boston Spa.

N.W.—Sedbergh. Mickle Fell. Great Shunnor Fell. Jervaulx Abbey.

N.E.—Seamer. Egton. Staindale. Pilmoor, near Thirsk. Scarborough Mere. Terrington. Malton. Carlton Bank.

S.E.—Near Stetton. Newsholme. Loftsome Bridge, near Wressle. Market Weighton. Driffield; Newsham Lake; Cottingham; Wawne; Beverley; Reservoir waterworks, Hull (G. Norman).

Var. **coronatum** (Ehrenb.) V.H.

S.W.—Doncaster town water (M. H. Stiles).

911. **Gomphonema Augur** Ehrenb.

[Syn. *G. cristatum* Ralfs].

MID W.—Staveley Dam, near Knaresborough.

N.W.—Cronkley Fell.

S.E.—Wressle.

912. **Gomphonema montanum** Schumann.

Var. **commutatum** Grun.

S.W.—Askern district; Firsby reservoir; Doncaster town water; Rossington (M. H. Stiles).

913. **Gomphonema tenellum** Kütz.

S.W.—Marley, near Bingley. Liversedge (Rev. W. Fowler!). Heaton. Keighley. Ogden Clough.

MID W.—Whernside. Ribblehead. Baildon. Wigton Moor. Eldwick.

N.E.—Scarborough Mere. Staindale. Cornelian Bay. Pilmoor, near Thirsk. Ingleby Greenhow.

S.E.—Near Meaux Abbey. Routh. Waghen. Beverley, Near Sutton. Newsholme. Near Stoneferry; Driffield; Skirlaugh; Hull (G. Norman).

914. **Gomphonema gracile** Ehrenb.

MID W.—Staveley Dam, near Knaresborough. Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

N.E.—Carlton Bank.

Var. **dichotomum** (Kütz.) V.H.

[Syn. *G. dichotomum* Kütz.].

MID W.—Shipley Glen. Pond at Horsforth.

N.W.—Cronkley Fell.

N.E.—Strensall.

S.E.—Waghen. Near Sutton. Near Meaux Abbey. Routh. Tickton. Newbald; Wawne; Market Weighton (G. Norman).

915. **Gomphonema intricatum** Kütz.

S.W.—Askern, Cusworth and Hatfield districts; Firsby reservoirs (M. H. Stiles). Ogden Clough. Morley. Goole. Elslack.

MID W.—Whernside. Baildon. Bolton Woods.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Dodd Fell.

N.E.—Saltburn. Pilmoor, near Thirsk.

S.E.—Loftsome Bridge, near Wressle. Market Weighton. Wawne; Anlaby to Hessle; Benningholme; River Derwent (G. Norman).

Var. **Vibrio** (Ehrenb.) V. H. [Syn. *G. Vibrio* **Ehrenb.**].

S.W.—Askern district (M. H. Stiles). Ogden Clough. Cullingworth. Crimsworth Dean.

MID W.—Holden Gill, near Keighley. Baildon. Linn Gill. Near Knaresborough.

N.W.—Sedbergh.

S.E.—River Hull at Wawne (G. Norman).

916. **Gomphonema ventricosum** Greg.

N.W.—Cautley Spout, with sporangial valves.

917. **Gomphonema olivaceum** (Lyngb.) Kütz.

S.W.—Rossington (M. H. Stiles). Hatfield Chase (J. M. Kirk). Bradford.

MID W.—Roundhay (W. B. Turner). Kilnsey. Ingleton. Malham Tarn. Whernside.

N.W.—Near Sedbergh. Jervaulx Abbey. Snaizeholme Beck. Dodd Fell. Mickle Fell.

N.E.—Scarborough Mere. Terrington.

S.E.—Near Sutton. Newsholme. Near Meaux bbey. Benningholme; Cottingham; Reservoir Waterworks, Hull (G. Norman).

918. **Gomphonema parvulum** Kütz.

S.W.—Marley, near Bingley.

MID W.—Boston Spa.

N.W.—Jervaulx Abbey.

N.E.—Terrington.

Var. **lanceolatum** V.H.

N.W.—Jervaulx Abbey.

919. **Gomphonema angustatum** Kütz.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Bog, near Widdale Beck.

N.E.—Pilmoor, near Thirsk.

920. **Gomphonema insigne** Greg

S.E.—Newbald (G. Norman).

GENUS RHOICOSPHENIA Grun., 1860.

921. **Rhoicosphenia curvata** (Kütz.) Grun.

[Syn. *Gomphonema curvatum* Kütz.].

S.W.—Hatfield district; Rossington (M. H. Stiles). Bradford. Holbeck. Roche Abbey (M. H. Stiles; J. N. Coombe). Shipley. Castleford.

MID W.—Baildon. Harrogate (G. Norman). Markington (Rev. J. S. Tute). Ingleton.

N.W.—Holwick. Romaldkirk.

N.E.—Staithes. Hayburn Wyke. Scalby Beck. Saltburn. Malton.

S.E.—Newsholme. Cottingham; Reservoir waterworks, Hull (G. Norman).

922. **Rhoicosphenia fracta** (Schum.) Rabenh.

[Syn. *Gomphonema fractum* Schum.].

S.W.—Cullingworth. Kildwick.

MID W.—Adel Bog.

FAMILY *ACHNANTHEÆ*.

GENUS ACHNANTHIDIUM (Kütz.) Grun., 1880.

923. **Achnanthidium flexellum** (Kütz.) Bréb.

[Syn. *Cocconeis Thwaitesii* W. Sm.].

S.W.—Askern district (M. H. Stiles). Bingley. Ogden Clough, with auxospores and sporangial valves. Cusworth, near Doncaster! (M. H. Stiles). Hebden Bridge.

MID W.—Dripping rocks, Shipley Glen, abundant. Dripping rocks, Holden Gill, near Keighley. Ingleton. South of Cray Moss. Adel (W. B. Turner).

N.W.—Cautley Spout. Mickle and Cronkley Fells.

N.E.—Staindale.

S.E.—Newbald; Cottingham (G. Norman).

GENUS ACHNANTHES Bory, 1822.

924. **Achnanthes coarctata** (Bréb.) Grun.

[Syn. *Achnanthidium coarctatum* Bréb.].

S.W.—Bingley.

925. **Achnanthes microcephala** (Kütz.) Grun.

[Syn. *Achnanthidium microcephalum* Kütz.].

S.W.—Ogden Clough.

Mid W.—Chapel Allerton (J. Abbott). Baildon. Linn Gill. Penyghent. Dropping Well, Knaresborough.

N.W.—Jervaulx Abbey. Lund's Fell.

N.E.—Scarborough Mere. Terrington.

S.E.—Tickton. Waghen. Routh. Hull (G. Norman).

926. **Achnanthes exilis** Kütz.

S.W.—Cusworth and Hatfield districts (M. H. Stiles). Roche Abbey (J. N. Coombe; M. H. Stiles). Mirfield. Cullingworth. Frizinghall. Coley, near Shelf. Denholme.

Mid W.—Baildon. Malham Tarn. Horsforth. Arthington. Bolton Woods. Whernside. Buckden. Simon's Fell. Boston Spa. Wigton Moor.

N.W.—Cautley Spout. Mickle Fell. Snaizeholme Beck.

N.E.—Hayburn Wyke. River Derwent, Forge Valley. Beast Cliff. Saltburn. Pilmoor, near Thirsk.

S.E.—Near Meaux Abbey. Newsholme. Tickton. Beverley. Newbald; Cottingham; Hull; Wawne (G. Norman).

927. **Achnanthes linearis** (W. Sm.) Grun.

[Syn. *Achnanthidium lineare* W. Sm.].

N.W.—Dodd Fell.

N.E.—Ingleby Greenhow.

S.E.—Cottingham; Skirlaugh; Benningholme (G. Norman).

928. **Achnanthes lanceolata** (Bréb.) Grun.

[Syn. *Achnanthidium lanceolatum* Bréb.].

S.W.—Askern district (M. H. Stiles). Cullingworth. Liversedge (Rev. W. Fowler!). Shipley. Denholme. Farnley. Near Bingley. Doncaster. Cragg Vale, towards Blackstone Edge. Woolley. Elslack.

Mid W.—Baildon. Whernside. Boston Spa. Ribblehead. Penyghent. Moughton Fell.

N.W.—Jervaulx Abbey. Mickle Fell.

N.E.—Strensall (W. B. Turner). Saltburn.

S.E.—Beverley. Routh. Near Meaux Abbey. Waghen. Cottingham; Wawne (G. Norman).

929. **Achnanthes Biasolettiana** Grun.

N.W.—Jervaulx Abbey.

930. **Achnanthes Hungarica** Grun.

S.W.—Horton Park, Bradford.

N.W.—Jervaulx Abbey, vii., 1898, abundant.

GENUS COCCONEIS Ehrenb., 1835.

931. **Cocconeis Pediculus** Ehrenb.

S.W.—Cusworth and Hatfield districts; Rossington (M. H. Stiles). Castleford.

MID W.—Roundhay (W. B. Turner). Wetherby. Baildon. Esholt. Holden Gill, near Keighley. Arthington. Harrogate. Bolton Woods. Near Settle. Kilnsey. Cowside Beck, Arncliffe. Oughtershaw Moss. Ingleton. Ribblehead. Bog two miles south of Clapham. Moughton Fell. Knaresborough.

N.W.—Duerley Beck, near Hawes.

N.E.—Frequent. Hayburn Wyke. Scalby Beck. Terrington. Rievaulx Abbey. Malton. Stokesley.

S.E.—Beverley. Cottingham; River Hull, etc. (G. Norman).

932. **Cocconeis Placentula** Ehrenb.

S.W.—Askern and Hatfield districts; Firsby Reservoirs; Rossington (M. H. Stiles). Roche Abbey (M. H. Stiles; J. N. Coombe). Marley, near Bingley. Ogden Clough. Doncaster. Frizinghall.

MID W.—Harrogate (G. Norman). Baildon. Malham Tarn. Moughton Fell. Cowside Beck, Arncliffe. Hawksworth Springs.

N.W.—Masham. Great Shunnor Fell. Jervaulx Abbey. Dodd Fell.

N.E.—River Derwent, Forge Valley. Seamer. Saltburn. Carlton Bank.

S.E.—Hornsea Mere. Routh. Newsholme. Beverley. Loftsome Bridge, near Wressle.

Forma **perpusilla** Rabenh.

MID W.—Baildon. Ribblehead. Moughton Fell.

ORDER PSEUDORAPHIDIEÆ.

FAMILY *EPITHEMIEÆ*.

GENUS EPITHEMIA Bréb, 1838.

933. **Epithemia turgida** (Ehrenb.) Kütz.

S.W.—Askern and Hatfield districts (M. H. Stiles). Cullingworth. Near Doncaster.

MID W.—Bramhope (J. Abbott). Baildon. Malham. Ingleton. Holden Gill, near Keighley. Bolton Woods. Boston Spa. Crook Gill, one mile from Buckden.

N.W.—Cautley Spout. Jervaulx Abbey.

N.E.—'Common.' Levisham. Hayburn Wyke. On moist ground, Whitenab, Scarborough. Cleava Cliffs, north of Scalby. Carlton Bank. Stokesley. Malton.

S.E.—Newsholme. Market Weighton. Wressle. Peat Deposit, Hornsea; Risby Pond; Stepney Lane (G. Norman).

Var. **Westermanni** Kütz.

[Syn. *Epithemia Westermanni* Kütz.].

S.W.—Ogden Clough.

MID W.—Penyghent.

N.W.—Cronkley Fell. Great Shunnor Fell.

N.E.—Staindale. Levisham.

Var. **granulata** (Kütz.) Van Heurck.

[Syn. *Epithemia granulata* Kütz.].

S.E.—Hornsea Mere; Hornsea Deposit (G. Norman).

934. **Epithemia Sorex** Kütz.

S.W.—Hatfield district (M. H. Stiles).

MID W.—Malham Tarn.

N.W.—Cotterdale.

N.E.—Malton. Stokesley.

S.E.—Hornsea Mere. Stepney Lane (G. Norman).

935. **Epithemia gibba** Kütz.

S.W.—Askern and Hatfield districts; Doncaster (!) town

water (M. H. Stiles). Cullingworth. Ogden Clough. Crimsworth Dean.

MID W.—Baildon. Adel Bog. Malham Tarn. Holden Gill, near Keighley. South of Cray Moss. Near Buckden.

N.W.—Cautley. Cronkley Fell. Great Shunnor Fell. Cotterdale.

N.E.—Scarborough Mere. Staindale. Levisham. Moist ground, Whitenab, Scarborough (with sporangial forms). Carlton Bank. Malton. Stokesley.

S.E.—Market Weighton. Risby Pond; Driffield (G. Norman).

Var. **ventricosa** (Kütz.) V.H.

[Syn. *Epithemia ventricosa* Kütz.].

S.W.—Roche Abbey (M. H. Stiles).

MID W.—Moughton Fell.

N.W.—Mickle Fell. Great Shunnor Fell.

N.E.—Lockton.

S.E.—Risby Pond; Wawne; Hornsea Peat Deposit (G. Norman).

936. **Epithemia Argus** (Ehrenb.) Kütz.

S.W.—Near Bradford. Cullingworth.

MID W.—South of Cray Moss.

N.W—Masham. Holwick. Mickle Fell. Great Shunnor Fell. Cotterdale. Great Sleddale.

N.E.—Moist ground, Whitenab, Scarborough. Great Ayton. Stokesley.

S.E.—Newsholme. Hornsea Deposit (G. Norman).

Var. **alpestris** (W. Sm.) Rabenh. [Syn. *Epithemia alpestris* W. Sm.; *E. Argus* var. *amphicephala* Grun.].

S.W.—Cullingworth. Ogden Clough, in gelatinous masses with auxospores and sporangial valves. Hebden Bridge.

MID W.—Cray Moss.

N.W.—Cautley Spout.

N.E.—Staindale. Beast Cliff.

S.E.—Hornsea Deposit (G. Norman).

937. **Epithemia gibberula** (Ehrenb.) Kütz.

S.W.—Cragg Vale, towards Blackstone Edge.

S.E.—Market Weighton.

Var. **rupestris** (W. Sm.) Rabenh.

[Syn. *Epithemia rupestris* W. Sm.].

S.W.—Crimsworth Dean.

MID W.—Cray Moss.

N.W.—Great Shunnor Fell.

938. **Epithemia Zebra** (Ehrenb.) Kütz.

S.W.—Hatfield district (M. H. Stiles).

N.W.—Cronkley Fell. Cotterdale.

S.E.—Hornsea Mere; Driffield; Wawne (G. Norman).

Var. **proboscidea** (Kütz.) Grun.

S.E.—Hornsea Deposit (G. Norman).

939. **Epithemia Hyndmanni** W. Sm.

S.E.—Peat Deposit, Hornsea (G. Norman).

GENUS EUNOTIA Ehrenb., 1837.

940. **Eunotia Arcus** Ehrenb.

[Syn. *Himantidium Arcus* W. Sm.].

S.W.—Askern and Cusworth districts; Roche Abbey (M. H. Stiles). Cullingworth. Oxenhope. Ogden Clough.

MID W.—Cocket Moss, near Giggleswick. Penyghent.

N.W.—Cautley Spout. Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Goathland.

S.E.—Wawne (G. Norman).

Var. **minor** V.H.

S.W.—Hatfield district; Rossington (M. H. Stiles).

Var. **bidens** V.H.

S.W.—Askern district; Roche Abbey (M. H. Stiles).

941. **Eunotia major** (W. Sm.) Rabenh.

[Syn. *Himantidium majus* W. Sm.].

S.W.—Cullingworth. Keighley Moor.

MID W.—Black Hill, near Settle.

N.W.—Cronkley Fell. Great Shunnor Fell. Bog near Widdale Beck.

N.E.—Seamer. Carlton Bank.

S.E.—Cottingham (G. Norman).

942. **Eunotia gracilis** (Ehrenb.) Rabenh.

[Syn. *Himantidium gracile* Ehrenb.].

S.W.—Hatfield district (M. H. Stiles). Cullingworth. Marley, near Bingley. Greetland, near Halifax. Ogden Clough. Elslack.

Mid W.—Blubberhouses (W. B. Turner). Adel Bog. Ilkley. Cam Fell. Whernside. Cocket Moss, near Giggleswick. Bog two miles south of Clapham.

N.W.—Penhill Beacon. Jervaulx Abbey. Bog near Widdale Beck. Dodd Fell. Cowgill Wold Moss, Widdale Fell. Leeming. Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Near Scarborough. Ingleby.

S.E.—River Hull (G. Norman).

943. **Eunotia exigua** (Bréb.) Rabenh.

S.W.—Askern district (M. H. Stiles). Wibsey. Ogden Clough.

Mid W.—Near Buckden. Giggleswick Common.

N.W.—Bog near Widdale Beck. Dodd Fell.

N.E.—Carlton Bank. Malton.

944. **Eunotia pectinalis** (Dillw.) Rabenh.

[Syn. *Himantidium pectinale* (Dillw.) Kütz.].

S.W.—Firsby reservoirs (M. H. Stiles). Bingley. Cullingworth. Ogden Clough. Doncaster. Cragg Vale, towards Blackstone Edge.

Mid W.—Wetherby (F. A. Lees). Baildon. Near Knaresborough. Earl Seat. Kilnsey. Cray Moss. Ribbleshead. Giggleswick Common. Ingleton.

N.W.—Mickle and Cronkley Fells. Great Shunnor Fell. Great Sleddale.

N.E.—Beast Cliff. Terrington. Staindale. Carlton Bank. Scarborough. Saltersgate (G. Norman).

S.E.—Cottingham (G. Norman).

Var. **ventricosa** Grun.

S.W.—Hatfield district; Doncaster town water (M. H. Stiles).

Var. **undulata** (W. Sm.) Ralfs.

[Syn. *Himantidium undulatum* W. Sm.].

S.W.—Roche Abbey (M. H. Stiles). Cullingworth.

MID W.—Blubberhouses (W. B. Turner). Hawksworth (E. Hunter). Whernside. Adel Dam. Baildon.

N.E.—Goathland. Near Scarborough. Saltersgate (G. Norman.)

945. **Eunotia Faba** (Ehrenb.) Grun.

[Syn. *Himantidium Soleirolei* Kütz.].

S.W.—Kildwick. Ogden Clough.

MID W.—Ingleton.

N.W.—Cotterdale.

N.E.—Ingleby.

646. **Eunotia Veneris** Kütz. [Syn. *E. incisa* Greg.].

S. W.—Ogden Clough. Near Shipley.

MID W.—Giggleswick Common.

N.W.—Mickle Fell.

N.E.—Carlton Bank.

S.E.—Riccall Common. Skipwith Common.

947. **Eunotia prærupta** Ehrenb.

Var. **bidens** (Ehrenb.) Grun.

[Syn. *E. bidens* (Ehrenb.) W. Sm.].

MID W.—Holden Gill, near Keighley.

S.E.—Riccall Common. Newsholme, near Howden.

948. **Eunotia monodon** Ehrenb.

S.W.—Roche Abbey (M. H. Stiles; J. N. Coombe).

N.W.—Mickle Fell.

949. **Eunotia robusta** Ralfs.

Var. **tetraodon** V.H.

S.W.—Doncaster town water (M. H. Stiles).

N.E.—Strensall. Lockton.

950. **Eunotia triodon** Ehrenb.

MID W.—Roundhay (W. B. Turner).

951. **Eunotia diodon** Ehrenb.

MID W.—Ilkley. Near Buckden.

N.W.—Cronkley Fell.

N.E.—Strensall.

952. **Eunotia Smithii** Gutw., 1895. [Syn. *E. gracilis* W. Sm.; non *E. gracilis* (Ehrenb.) Rabenh.].

S.W.—Saltaire, in great abundance among *Microspora floccosa* in boggy field.

MID W.—Baildon.

953. **Eunotia lunaris** (Ehrenb). Grun. [Syn. *Synedra lunaris* Ehrenb.].

S.W.—Doncaster town water; Firsby reservoirs; Hatfield district (M. H. Stiles). Cullingworth. Chellow Dean. Mirfield. Elslack. Keighley Moor. Ogden Clough.

MID W.—Wigton Moor. Baildon. Adel Bog. Penyghent. Eldwick. Ilkley. Bolton Woods. Boston Spa. Black Hill, near Settle. Cam Fell. Whernside. Cocket Moss, near Giggleswick. Bowland Knotts. Bog, two miles south of Clapham.

N.W.—Sedbergh. Great Sleddale. Jervaulx Abbey. Lund's Fell. Bog near Widdale Beck. Cronkley Fell. Mickle Fell. Great Shunnor Fell.

N.E.—Staindale. Terrington. Carlton Bank. Malton.

S.E.—Skipwith Common (Rev. W. Fowler!). Market Weighton.

Var. **bilunaris** (Ehrenb.) Grun.

MID W.—Cocket Moss, near Giggleswick.

N.W.—Mickle Fell.

S.E.—Beverley. Market Weighton.

Var. **undulata** Rabenh.

N.E.—Goathland.

954. **Eunotia flexuosa** Kütz.

Var. **bicapitata** Grun.

S.W.—Hatfield district (M. H. Stiles). Cullingworth.

GENUS CERATONEIS Ehrenb., 1840.

955. **Ceratoneis Arcus** (Ehrenb.) Kütz.

[Syn. *Eunotia Arcus* (Ehrenb.) W. Sm.].

MID W.—Whernside. Holden Gill, near Keighley. Simon Seat.

N.W.—Calf Beck, Howgill Fells. Cautley Spout. Great Shunnor Fell. Muker. Hunter's Hole, Craydale Moor (1900 ft.). Mickle Fell. Cowgill Wold Moss, Widdale Fell.

Var. **Amphioxys** (Rabenh.) De Toni.

[Syn. *Ceratoneis Amphioxys* Rabenh.].

MID W.—Whernside. Leathley. Holden Gill, near Keighley. Harrogate. Oak Beck.

N.W.—Calf Beck, Howgill Fells. Lund's Fell.

FAMILY *SYNEDREÆ*.

GENUS SYNEDRA Ehrenb., 1831.

956. **Synedra pulchella** Kütz.

S.W.—Doncaster town water; Firsby reservoirs; Hatfield district (M. H. Stiles). Bingley. Liversedge (Rev. W. Fowler!). Keighley. Shipley. Farnley.

MID W.—Baildon. Whernside. Arthington. Otley. Kilnsey. Boston Spa. Harrogate. Ribblehead.

N.W.—Mickle Fell. River Ure.

N.E.—Hayburn Wyke. Rievaulx Abbey. Ingleby Greenhow. Malton.

S.E.—Tickton. Loftsome Bridge, near Wressle. Riccall Common. Reservoir Waterworks, Hull (G. Norman).

Var. **acicularis** (W. Sm.). [Syn. *Synedra acicularis* W. Sm.; *S. Smithii* Ralfs; *S. pulchella* var. *Smithii* (Ralfs) V.H.].

S.W.—Mirfield.

Var. **minutissima** (W. Sm.). [Syn. *Synedra minutissima* W. Sm.; *S. pulchella* var. *lanceolata* O'Meara].

MID W.—Buckden.

N.E.—Scarborough Mere. Hayburn Wyke. Scalby Beck. River Derwent, Forge Valley.

S.E.—Newsholme. Near Stoneferry (G. Norman).

957. **Synedra Vaucheriæ** Kütz.

S.W.—Mirfield. Allerton. Frizinghall. Cragg Vale, towards Blackstone Edge. Halifax.

MID W.—Baildon. Hawksworth Springs.

S.E.—Newsholme. Loftsome Bridge, near Wressle.

958. **Synedra Ulna** (Nitzsch) Ehrenb.

S.W.—Askern, Cusworth, and Hatfield districts; Firsby reservoirs; Rossington (M. H. Stiles). Roche Abbey (M. H. Stiles; J. N. Coombe). Woolley. Doncaster. Bingley. Fixby. Denholme. Bradford. Mirfield. Morley. Ogden Clough.

MID W.—Markington (Rev. J. S. Tute). Ripley; Harrogate! (G. Norman). Blubberhouses (W. B. Turner). Baildon. Kildwick. Ilkley. Otley. Holden Gill, near Keighley. Leathley. Above Eldwick. Bolton Woods. Boston Spa. Menston.

N.W.—Cautley Spout. Great Sleddale. Mickle and Cronkley Fells. Great Shunnor Fell.

N.E.—Peat deposit, Filey. Scalby Beck. River Derwent, Forge Valley. Staindale. Rievaulx Abbey. Pilmoor, near Thirsk. Malton! (G. Norman). Ingleby.

S.E.—Loftsome Bridge, near Wressle. Beverley. Waghen. Haltenprice. Wawne; Reservoir waterworks, Hull; Hornsea Peat Deposit (G. Norman).

Forma **salina** (W. Sm.). [Syn. *Synedra salina* W. Sm.; *S. Ulna* forma *marina* Rabenh.].

S.E.—Market Weighton Canal (G. Norman).

Var. **splendens** (Kütz.) Brun.

[Syn. *S. splendens* Kütz.; *S. radians* W. Sm.].

S.W.—Firsby reservoirs (M. H. Stiles). Askern (Rev. F. H. Allen). Woolley. Bradford. Bingley. Doncaster. Goole. Roche Abbey (J. N. Coombe). Farnley. Elslack.

MID W.—Roundhay; South Milford (W. B. Turner). Austwick. Baildon. Malham Cove (J. M. Kirk). Boston Spa. Knaresborough. Bell Busk.

N.W.—Sedbergh. Mickle and Cronkley Fells.

N.E.—Malton. Scarborough.

S.E.—Beverley. Routh. Spring Ditch; Risby Pond; River Derwent; Cottingham; Newbald; Wawne; Reservoir Waterworks, Hull (G. Norman).

Var. **subæqualis** (Grun.) V.H.

S.W.—Hatfield district (M. H. Stiles).

Var. **æqualis** (Kütz.) Rabenh. [Syn. *S. æqualis* Kütz.].

S.E.—Riccall Common.

Var. **longissima** (W. Sm.) Grun.

[Syn. *S. longissima* W. Sm.].

S.W.—Wilsden.

MID W.—Rombald's Moor.

Var. **amphirhynchus** (Ehrenb.) V.H.

[Syn. *S. amphirhynchus* Ehrenb.].

S.W.— Doncaster town water (M. H. Stiles).

Var. **obtusa** (W. Sm.) V.H. [Syn. *S. obtusa* W. Sm.].

N.E.—Egton.

Var. **oxyrhynchus** (Kütz.) V.H.

[Syn. *S. oxyrhynchus* Kütz.].

S.W.—Cullingworth.

959. **Synedra Acus** (Kütz.) Grun.

S.W.—Hatfield district; Rossington (M. H. Stiles). Greetland, near Halifax. Fixby.

MID W.—Kilnsey. Bell Busk. Wigton Moor. Bolton Woods. Harrogate. Ilkley.

N.E.—Pilmoor, near Thirsk. Ingleby. Malton.

S.E.—Loftsome Bridge, near Wressle. Newsholme. Near Meaux Abbey. Skipwith Common.

Var. **delicatissima** (W. Sm.) Grun.

[Syn. *S. delicatissima* W. Sm.].

S.W.—Fixby. Marley, near Bingley.

N.W.—Jervaulx Abbey.

N.E.—Scarborough Mere. Strensall. Terrington. Malton.

S.E.—Market Weighton.

960. **Synedra radians** (Kütz.) Grun.

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles). Doncaster. Ogden Clough.

Mid W.—Rombald's Moor. Near Buckden.

S.E.—Market Weighton. Skipwith Common.

961. **Synedra capitata** Ehrenb.

S.W.—Askern and Hatfield districts (M. H. Stiles). Hunslet (J. Abbott). Goole; Roche Abbey (E. Hunter). Near Shipley.

Mid W.—South Milford (W. B. Turner). Malham Cove (J. M. Kirk). Staveley Dam, near Knaresborough.

N.E.—Strensall. Near Scarborough.

S.E.—Beverley. Spring Ditch; Risby Pond; Reservoir Waterworks, Hull; Hornsea Peat Deposit (G. Norman).

962. **Synedra famelica** Kütz.

Mid W.—Harrogate. Hawksworth Springs. Bog two miles south of Clapham. Malham Tarn.

N.W.—Cautley Spout. Snaizeholme Beck.

963. **Synedra affinis** Kütz. var. **fasciculata** (Kütz.) V.H. [Syn. *S. fasciculata* Kütz.].

Mid W.—Outlet to lake, Ripley (G. Norman).

[*S. hamata* W. Sm., recorded for the outlet of the lake, Ripley Castle, is probably a variety of *S. affinis* Kütz.].

964. **Synedra amphicephala** Kütz.

Mid W.—Ingleton, on wet rocks, amongst *Cladophora glomerata.*

Genus ASTERIONELLA Hass., 1850.

965. **Asterionella formosa** Hass.

S.W.—Askern district (M. H. Stiles). Greetland, near Halifax.

Mid W.—Ripley Castle (G. Norman). Cowthorpe. Peny-

ghent. Holden Gill, near Keighley. Wigton Moor. Moughton Fell.

N.W.—Mickle Fell. Romaldkirk.

N.E.—Strensall.

FAMILY *FRAGILARIEÆ.*

GENUS FRAGILARIA Lyngb., 1819.

966. **Fragilaria virescens** Ralfs.

S.W.—Not uncommon about Bradford. Marley, near Bingley.

MID W.—Hawksworth Springs (H. F. Parsons). Bowland Knotts.

N.E.—Terrington.

S.E.—Cottingham; Wawne; Inglemire Lane (G. Norman).

967. **Fragilaria capucina** Desmaz.

S.W.—Cusworth and Hatfield districts; Rossington (M. H. Stiles). Askern (J. M. Kirk; M. H. Stiles). Hatfield Chase (J. M. Kirk). Roche Abbey (J. N. Coombe; M. H. Stiles). Bradford. Cullingworth. Doncaster. Bingley. Denholme. Oxenhope. Worth Valley and Keighley Tarn.

MID W.—Chapeltown; Roundhay (W. B. Turner). Malham Cove (J. M. Kirk). Adel Bog. Holden Gill, near Keighley. Whernside. Arthington. Ilkley.

N.W.—Sedbergh. Mickle Fell.

N.E.—Lockton. Egton. Strensall. Scarborough Mere. Terrington. Malton. Stokesley.

S.E.—Tickton. Near Meaux Abbey. Newsholme. Beverley. Loftsome Bridge, near Wressle. Hull; Cottingham; Inglemire Lane (G. Norman).

Var. **mesolepta** Rabenh.

S.W.—Firsby reservoirs (M. H. Stiles).

MID W.—Cocket Moss, near Giggleswick.

N.E.—Lockton.

968. **Fragilaria construens** (Ehrenb.) Grun.

[Syn. *Odontidium Tabellaria* W. Sm.].

S.W.—Cusworth, near Doncaster. Doncaster town water; Hatfield district; Rossington (M. H. Stiles).

MID W.—Langcliffe, near Settle. Malham Tarn Bog.

S.E. — Beverley. Hornsea Mere; Risby Pond; Wawne; Hornsea Peat Deposit (G. Norman).

Var. **binodis** Grun.

[Syn. *Odontidium parasiticum* W. Sm., pro parte].

MID W.—Pond at Horsforth! (Miss J. Town), attached to *Surirella biseriata* and *Cymatopleura Solea*.

S.W.—Roche Abbey (M. H. Stiles; J. N. Coombe).

S.E.—Market Weighton Canal; Beverley Parks (G. Norman).

969. **Fragilaria Harrisonii** (W. Sm.) Grun.

[Syn. *Odontidium Harrisoni* W. Sm.].

S.W.—Cusworth district (M. H. Stiles). Roche Abbey (J. N. Coombe; M. H. Stiles).

MID W.—Langcliffe, near Settle.

S.E.—Haltenprice; Spring Head; Hornsea Peat Deposit; Spring Ditch; Cottingham; near Hull (G. Norman).

970. **Fragilaria mutabilis** (W. Sm.) Grun.

[Syn. *Odontidium mutabile* W. Sm.].

S.W.—Cusworth district (M. H. Stiles). Marsden. Cullingworth. Roche Abbey (M. H. Stiles; J. N. Coombe). Fixby.

MID W.—Holden Gill, near Keighley. Baildon. Staveley Dam, near Knaresborough. Ribblehead.

N.W.—Howgill Fells. Great Shunnor Fell.

N.E.—Saltburn. Scarborough.

S.E.—Beverley. Waghen. Loftsome Bridge, near Wressle. Risby Pond; Wawne; Market Weighton Canal; Cottingham; Spring Ditch (G. Norman).

FAMILY *MERIDIONIDÆ*.

GENUS MERIDION Ag., 1824.

971. **Meridion circulare** (Grev.) Ag.

S.W.—Cusworth and Hatfield districts; Roche Abbey; Doncaster town water (M. H. Stiles). Woolley. Saltaire. Marley, near Bingley. Elslack. Coley, near Shelf (pure gathering).

MID W.—Near Norwood Hall, above Lindley Reservoir. Kilnsey. Malham Cove. Malham Tarn Bog. Horton-in-Ribblesdale. Ribblehead. Whernside. Boston Spa. Baildon. Eldwick.

N.W.—Lund's Fell. Dodd Fell. Howgill Fells. Widdale Fell. Mickle Fell. Great Shunnor Fell. Hawes.

S.E.—Beverley. Routh. Loftsome Bridge, near Wressle. Tickton. Near Meaux Abbey. Haltenprice. Cottingham; Market Weighton; Driffield (G. Norman).

Var. **constrictum** (Ralfs) V.H.

[Syn. *Meridion constrictum* Ralfs].

S.W.—Keighley.

N.W.—Cronkley Fell. Great Shunnor Fell. Cotterdale.

S.E.—Spring Ditch (Dr. Munroe).

FAMILY *DIATOMEÆ.*

GENUS DIATOMA DC., 1805.

972. **Diatoma vulgare** Bory.

S.W.—Cusworth district; Rossington; Roche Abbey (M. H. Stiles). Askern (G. Norman; M. H. Stiles). Hatfield Chase (G. Norman). Roche Abbey (J. N. Coombe). Shipley.

MID W.—Harrogate (G. Norman). Arthington. Near Norwood Hall, above Lindley Reservoir. Holden Gill, near Keighley. Bolton Woods. Otley. Oughtershaw Moss. Whernside. Ripley; Knaresborough (G. Norman).

N.W.—Winch Bridge. Mickle Fell.

N.E.—Whitby. Lockton. Strensall (W. B. Turner). Hayburn Wyke. Scalby Beck. Malton (G. Norman).

S.E.—Loftsome Bridge, near Wressle. Skipwith Common. Wawne; Reservoir Waterworks, Hull (G. Norman).

973. **Diatoma elongatum** Ag.

S.W.—Cusworth and Hatfield districts; Firsby reservoirs; Rossington (M. H. Stiles). Roche Abbey (J. N. Coombe; M. H. Stiles). Shipley. Doncaster. Liversedge (Rev. W. Fowler!). Fixby. Goole. Heaton.

MID W.—Ripley (G. Norman). Blubberhouses; Roundhay (W. B. Turner). Holden Gill, near Keighley. Adel. Buckden. Staveley Dam, near Knaresborough. Hawksworth.

N.W.—Winch Bridge.

N.E.—Whitby. Scarborough Mere. Strensall! (W. B. Turner). Scalby Beck.

S.E.—Beverley. Newsholme. Loftsome Bridge, near Wressle. Skirlaugh. Reservoir Waterworks, Hull; Market Weighton (G. Norman).

Var. **Ehrenbergii** (Kütz.) V.H.

[Syn. *D. Ehrenbergii* Kütz.; *D. grande* W. Sm.].

S.W.—Trough near Shipley.

MID W.—Markington (Rev. J. S. Tute). Malham Tarn Bog.

S.E.—Hull (G. Norman).

974. **Diatoma hiemale** (Lyngb.) Heib.

[Syn. *Odontidium hiemale* (Lyngb.) Kütz.].

S.W.—Wilsden. Greetland, near Halifax. Crimsworth Dean.

MID W.—Blubberhouses (W. B. Turner). Holden Gill, near Keighley.

N.W.—Mickle Fell. Sedbergh. Howgill Fells.

N.E.—Lockton. Scarborough Mere. Rievaulx Abbey. Carlton Bank.

S.E.—Beverley.

Var. **mesodon** (Kütz.) V.H.

[Syn. *Odontidium mesodon* Kütz.].

S.W.—Bradford. Roche Abbey (J. N. Coombe). Worth Valley, near Keighley. Denholme. Ogden Clough. Crimsworth Dean. Hebden Bridge.

MID W.—Blubberhouses; Roundhay (W. B. Turner) Shipley Glen. Holden Gill, near Keighley. Malham Cove. Whernside. Kilnsey.

N.W.—Mickle Fell. Holwick. Dodd Fell. Great Shunnor Fell. Calf Beck, Howgill Fells.

975. **Diatoma anceps** (Ehrenb.) Grun.

N.W.—Bog, near Widdale Beck, abundant, iv. 1898.

GENUS DENTICULA Kütz., 1844.

976. **Denticula tenuis** Kütz.

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles). Crimsworth Dean.

MID W.—Holden Gill, near Keighley. Shipley Glen. Simon's Fell. Ingleton.

N.W.—Cautley Spout.

N.E.—Beast Cliff.

S.E.—Wressle. Wawne (G. Norman). Anlaby Road (Dr. Munroe).

Var. **crassula** (Näg.). [Syn. *D. crassula* Näg., 1849; *D. inflata* W. Sm., 1856].

MID W.—Ingleton.

N.W.—Great Shunnor Fell.

S.E.—Newbald (G. Norman).

977. **Denticula elegans** Kütz.

S.W.—Ogden Clough.

FAMILY *TABELLARIEÆ.*

GENUS TABELLARIA Ehrenb., 1839.

978. **Tabellaria fenestrata** (Lyngb.) Kütz.

S.W.—Cullingworth. Greetland, near Halifax. Skelmanthorpe. Keighley Moor.

MID W.—Blubberhouses (W. B. Turner). Ilkley.

N.W.—Baugh Fell. Mickle Fell. Cotterdale.

N.E.—Carlton Bank.

S.E.—Skipwith Common.

979. **Tabellaria flocculosa** (Roth.) Kütz.

S.W.—Bradford. Doncaster town water; Hatfield district (M. H. Stiles). Keighley Moor. Cragg Vale, towards Blackstone Edge. Cullingworth.

MID W.—Blubberhouses; Horsforth (W. B. Turner). Black Hill, near Settle. Near Buckden. Cam Fell. Ilkley. Cocket Moss, near Giggleswick. Bowland Knotts. Giggleswick Common.

N.W.—Sedbergh. Baugh Fell. Whernside. Mickle and Cronkley Fells. Great Shunnor Fell. Hawes.

N.E.—Pilmoor, near Thirsk. Saltersgate (G. Norman). Scarborough.

S.E.—Riccall Common. Cottingham; Spring Head; Spring Ditch; Risby Pond (G. Norman).

Var. **ventricosa** (Kütz.) Rabenh.

S.W.—Cullingworth.

Mid W.—Wigton Moor. Rombald's Moor. Baildon. Adel Dam.

N.W.—Leeming. Mickle Fell. Great Shunnor Fell.

N.E.—Scarborough Mere.

Genus TETRACYCLUS Ralfs, 1843.

980. **Tetracyclus rupestris** (A. Br.) Grun.

[Syn. *Gomphogramma rupestris* A. Br.].

S.W.—Goole (J. Harrison).

981. **Tetracyclus lacustris** Ralfs.

Mid W.—Roundhay (W. B. Turner).

Family *SURIRELLEÆ*.

Genus CYMATOPLEURA W. Sm., 1851.

982. **Cymatopleura elliptica** (Bréb.) W. Sm.

S.W.—Askern, Cusworth, and Hatfield districts; Rossington (M. H. Stiles). Goole; Roche Abbey (E. Hunter). Heaton. Cullingworth. Fixby.

Mid W.—Roundhay; South Milford (W. B. Turner). Hawksworth. Baildon. Malham Tarn Bog. Bolton Woods. Near Settle. Staveley Dam, near Knaresborough.

N.W.—Cronkley Fell. Dodd Fell.

N.E.—Levisham.

S.E.—Routh; Risby Pond; Wawne; Haltenprice; Hornsea Deposit; Cottingham; Spring Ditch; Beverley; Market Weighton Canal (G. Norman).

Var. **constricta** Grun.

S.W.—Goole.

Var. **Hibernica** (W. Sm.) V.H. [Syn. *C. Hibernica* W. Sm.].

S.W.—Firsby reservoirs; Hatfield district (M. H. Stiles). Marley, near Bingley.

MID W.—Hawksworth.

983. **Cymatopleura Solea** (Bréb.) W. Sm.

S.W.—Cusworth and Hatfield districts; Firsby reservoirs; Rossington (M. H. Stiles). Goole (E. Hunter). Roche Abbey (M. H. Stiles; E. Hunter). Askern (M. H. Stiles; F. H. Allen). Hatfield Chase (J. M. Kirk). Doncaster.

MID W.—Roundhay (W. B. Turner). South Milford (F. Emsley). Hawksworth. Moughton Fell. Penyghent. Whernside. Pool. Malham Tarn Bog. Baildon. Horsforth. Boston Spa. Harrogate.

N.W.—Cronkley Fell. Great Shunnor Fell. Hawes Junction.

N.E.—Levisham. Saltburn. Rievaulx Abbey. Malton. Carlton Bank.

S.E.—Beverley. Tickton. Newsholme. Routh. Loftsome Bridge, near Wressle. Market Weighton. Skipwith Common. Skirlaugh; Hornsea Deposit; Wawne; Reservoir, Hull; Cottingham; Haltenprice; Spring Ditch; Beverley (G. Norman).

Var. **apiculata** (W. Sm.) Ralfs. [Syn. *C. apiculata* W. Sm.].

S.W.—Marley, near Bingley. Roche Abbey (M. H. Stiles; J. N. Coombe). Horton Park, Bradford.

N.W.—Mickle Fell.

S.E.—Cottingham; Skirlaugh (G. Norman).

GENUS SURIRELLA Turp., 1827.

984. **Surirella biseriata** Bréb.

S.W.—Cusworth, near Doncaster (M. H. Stiles). Roche Abbey (J. N. Coombe; M. H. Stiles). Cullingworth. Marley, near Bingley.

MID W.—Blubberhouses; Roundhay; South Milford (W. B. Turner). Baildon. Eldwick. Saltaire. Adel Bog. Leathley. Cocket Moss, near Giggleswick.

N.W.—Leeming. Mickle Fell. Great Shunnor Fell.

N.E.—Scarborough Mere. Staindale. Carlton Bank.

S.E.—Beverley. Cottingham; River Hull; Market Weighton Canal; Wawne (G. Norman).

985. **Surirella linearis** W. Sm.

S.W.—Roche Abbey (J. N. Coombe; M. H. Stiles). Marley, near Bingley. Cullingworth. Greetland, near Halifax. Ogden Clough. Cragg Vale, towards Blackstone Edge.

Mid W.—Adel Bog. Eldwick. Kildwick. Appletreewick. Leathley. Black Hill, near Settle.

N.W.—Whernside. Mickle and Cronkley Fells. Great Shunnor Fell. Lund's Fell.

N.E.—Staindale. Terrington. Carlton Bank.

S.E.—Cottingham; Beverley Parks; Wawne; Hornsea Peat Deposit; Market Weighton Canal (G. Norman).

Var. **constricta** Grun.

N.W.—Baugh Fell.

986. **Surirella elegans** Ehrenb.

[Syn. *Campylodiscus elegans* (Ehrenb.) Rabenh.].

Mid W.—River Skell, Fountain's Abbey (G. Stuart; E. Grove).

S.E.—Hull (G. Norman).

987. **Surirella robusta** Ehrenb. [Syn. *S. nobilis* W. Sm.].

Mid W.—Cocket Moss, near Giggleswick. Bowland Knotts.

N.W.—Mickle Fell.

N.E.—Terrington.

S.E.—Hornsea Peat Deposit; Stoneferry; Cottingham; Market Weighton Canal (G. Norman).

Var. **splendida** (Ehrenb.) V.H.

[Syn. *S. splendida* (Ehrenb.) Kütz.].

S.W.—Doncaster town water; Rossington (M. H. Stiles). Horton Park.

Mid W.—Markington (Rev. J. S. Tute). Harrogate.

N.E.—Strensall. Scarborough Mere.

S.E.—Beverley. Spring Ditch; near Stoneferry; Market Weighton Canal (G. Norman).

988. **Surirella striatula** Turp.

S.W.—Goole (J. Harrison).

S.E.—Near Stoneferry; Market Weighton Canal (G. Norman).

989. **Surirella ovalis** Bréb.

S.W.—Askern and Hatfield districts; Doncaster town water; Firsby reservoirs (M. H. Stiles). Roche Abbey (J. N. Coombe). Goole. Farnley.

MID W.—Baildon. Saltaire.

N.E.—Seamer. Staithes. Beast Cliff.

S.E.—Near Stoneferry; Hornsea Peat Deposit; Anlaby to Hessle Road (G. Norman).

Var. **ovata** (Kütz.) V.H. [Syn. *Surirella ovata* Kütz.].

S.W.—Rossington (M. H. Stiles). Chellow Dean. Bingley. Goole. Near Shipley.

MID W.—Roundhay; South Milford (W. B. Turner). Harrogate (G. Norman).

N.E.—Strensall. Whitby. Staindale.

S.E.—Routh. Beverley. Near Meaux Abbey. River Hull; Skirlaugh; Dairycoats; Cottingham (G. Norman).

Var. **minuta** (Bréb.) V.H. [Syn. *Surirella minuta* Bréb.].

S.W.—Bradford. Allerton. Marley, near Bingley. Goole. Heaton. Fixby. Coley, near Shelf. Liversedge! (Rev. W. Fowler).

MID W.—Above Eldwick. Bolton Woods. Harrogate. Baildon.

N.W.—Mickle Fell. Reeth.

N.E.—Strensall. Seamer. Scalby Beck.

S.E. — Routh. Beverley. Newsholme. Tickton. Near Meaux Abbey. Waghen.

Var. **salina** (W. Sm.) V.H. [Syn. *Surirella salina* W. Sm.].

S.E.—Waghen.

Var. **angusta** (Kütz.) V.H.

[Syn. *Surirella angusta* Kütz.; *S. apiculata* W. Sm.].

S.W.—Cusworth, near Doncaster (!) (M. H. Stiles). Chellow Dean. Keighley Moor.

MID W.—Rombald's Moor. Near Otley. Moughton Fell.

N.W.—Rokeby.

N.E.—Marske. Strensall.

S.E.—Near Meaux Abbey. Stoneferry Lane (Dr. Munroe).

Var. **pinnata** (W. Sm.) V.H.

[Syn. *Surirella pinnata* W. Sm.].

S.W.—Rossington (M. H. Stiles). Near Bradford. Chellow Dean. Bingley. Ogden Clough. Near Shipley. Farnley.

MID W.—Eldwick. Adel Bog. Oughtershaw Moss.

N.E.—Strensall. Dalton. Seamer. Scalby Beck. Rievaulx Abbey. Malton.

S.E.—Beverley. Routh. Newsholme. Market Weighton. Risby Pond; Cottingham; Haltenprice; Hornsea Peat Deposit; ditch near river Hull (G. Norman).

Var. **panduriformis** (W. Sm.).

[Syn. *Surirella panduriformis* W. Sm.].

S.W.—Allerton.

MID W.—Harrogate (G. Norman).

N.W.—Mickle Fell. Rokeby.

S.E.—Tickton. Skirlaugh; Market Weighton Canal (G. Norman).

Var. **Crumena** (Bréb.) Van Heurck. [Syn. *Surirella Crumena* Bréb.; *S. Brightwellii* W. Sm.].

S.W.—Firsby reservoirs; Rossington (M. H. Stiles).

MID W.—Birk Craggs, Harrogate (G. Norman).

N.E.—Saltersgate (G. Norman).

S.E.—Outlet, Hornsea Mere; Hornsea Peat Deposit; river Hull; near Stoneferry; Reservoir Waterworks, Hull; Market Weighton Canal; Haltenprice (G. Norman).

990. **Surirella spiralis** Kütz.

[Syn. *Campylodiscus spiralis* W. Sm.].

S.W.—Roche Abbey (E. Hunter). Askern district (M. H. Stiles). Cullingworth. Marley, near Bingley. Hebden Bridge.

MID W.—Baildon. Hawksworth.

N.W.—Cronkley Fell. Dodd Fell.

N.E.—Staindale. Carlton Bank.

S.E.—Haltenprice; Skirlaugh (G. Norman).

991. **Surirella Craticula** Ehrenb.

S.E.—Hornsea Peat Deposit, very rare (G. Norman).

GENUS CAMPYLODISCUS Ehrenb., 1841.

992. **Campylodiscus Hibernicus** Ehrenb.

[Syn. *Campylodiscus costatus* W. Sm.].

S.W.—Cusworth (!) and Askern Districts (M. H. Stiles). Cullingworth.

MID W.—Baildon. Malham Tarn. Horton-in-Ribblesdale. South of Cray Moss.

S.E.—Spring Ditch; Cottingham; Haltenprice; Newbald; Hornsea Peat Deposit; Market Weighton Canal (G. Norman).

FAMILY *NITZSCHIEÆ.*

GENUS HANTZSCHIA Grun., 1877.

993. **Hantzschia amphioxys** (Ehrenb.) Grun.

[Syn. *Nitzschia amphioxys* (Ehrenb.) W. Sm.].

S.W.—Askern and Cusworth districts; Doncaster (!) town water; Rossington (M. H. Stiles). Roche Abbey (M. H. Stiles; J. N. Coombe). Goole. Bradford. Chellow Dean. Shipley.

MID W.—Killinghall; Harrogate (G. Norman). Baildon. Bolton Woods.

N.W.—Mickle Fell. River Ure.

N.E.—Strensall. Scarborough Mere. Rievaulx Abbey. Saltburn. Carlton Bank.

S.E.—Routh. Near Meaux Abbey. Waghen. Benningholme; Wawne; Cottingham; Market Weighton Canal (G. Norman).

GENUS NITZSCHIA Hass., 1845.

994. **Nitzschia punctata** (W. Sm.) Grun.

[Syn. *Tryblionella punctata* W. Sm.].

S.E.—Market Weighton Canal; pond, Stepney (G. Norman).

995. **Nitzschia Tryblionella** Hantzsch.

[Syn. *Tryblionella gracilis* W. Sm.].

S.W.—Goole (J. Harrison). Roche Abbey (M. H. Stiles; J. N. Coombe). Doncaster town water; Firsby reservoirs; Rossington (M. H. Stiles).

N.E.—Saltburn.

S.E.—Market Weighton. Stoneferry; Hornsea Peat Deposit (G. Norman).

996. **Nitzschia angustata** (W. Sm.) Grun.

[Syn. *Tryblionella angustata* W. Sm.].

S.W.—Roche Abbey (M. H. Stiles; J. N. Coombe).

S.E.—Newsholme. Beverley!; Market Weighton Canal; Anlaby (G. Norman).

997. **Nitzschia constricta** (Kütz.) Pritch.

[Syn. *N. dubia* W. Sm.].

S.W.—Goole (J. Harrison).

MID W.—Boston Spa. Hawksworth Springs. Bolton Woods. Ribblehead.

S.E.—Beverley. Loftsome Bridge, near Wressle. Tickton. Routh. Near Meaux Abbey. Waghen. Market Weighton. Cottingham; near Stoneferry; Wawne; Haltenprice; Dairycoats; Anlaby to Hessle Road; Skirlaugh; Stepney Lane (G. Norman).

Forma **minor** Rabenh.

MID W.—Baildon.

S.E.—Market Weighton.

998. **Nitzschia plana** W. Sm.

S.E.—Brackish ditch, near River Hull (G. Norman).

999. **Nitzschia parvula** W. Sm.

Often found on damp ground and amongst damp moss.

S.W.—Doncaster. Roche Abbey (J. N. Coombe). Ogden Clough.

MID W.—Boston Spa. Bolton Woods. Holden Gill, near Keighley.

N.W.—Great Shunnor Fell.

N.E.—Strensall. Marske. Rievaulx Abbey.

S.E.—Riccall Common. Beverley. Waghen. Market Weighton. Withernsea; Cottingham (G. Norman).

1000. **Nitzschia apiculata** (Greg.) Grun.

[Syn. *Tryblionella apiculata* Greg.].

S.E.—Patrington (G. Norman).

1001. **Nitzschia acuminata** (W. Sm.) Grun.

[Syn. *Tryblionella acuminata* W. Sm.].

S.W.—Goole (J. Harrison).

S.E.—Cottingham (G. Norman). Timber Pond, Hull (R. Harrison).

1002. **Nitzschia circumsuta** (Bail.) Grun.

[Syn. *Surirella circumsuta* Bail.; *Tryblionella Scutellum* W. Sm.].

S.W.—Goole (J. Harrison). Askern district (M. H. Stiles).

MID W.—Roundhay (W. B. Turner).

1003. **Nitzschia bilobata** W. Sm.

S.E.—Outlet of Hornsea Mere; Dairycoats; ditch near River Hull (G. Norman).

1004. **Nitzschia Denticula** Grun.

[Syn. *Denticula obtusa* W. Sm.].

MID W.—Malham Cove (J. M. Kirk). Bingley. Holden Gill, near Keighley.

N.E.—Beast Cliff. Near Scarborough.

1005. **Nitzschia sinuata** (W. Sm.) Grun.

[Syn. *Denticula sinuata* W. Sm.].

S.W.—Askern district (M. H. Stiles). Ogden Clough.

MID W.—Baildon. Holden Gill, near Keighley. Cowside Beck, Arncliffe.

S.E.—Market Weighton. Cottingham; Beverley Parks (G. Norman).

1006. **Nitzschia paradoxa** (Gmel.) Grun.

[Syn. *Bacillaria paradoxa* Gmel.].

S.W.—Goole.

S.E.—Near Stoneferry; Market Weighton Canal (G. Norman).

1007. **Nitzschia vivax** W. Sm.

S.E.—Near Stoneferry (G. Norman).

1008. **Nitzschia dissipata** (Kütz.) Grun.

[Syn. ? *N. minutissima* W. Sm.].

MID W.—Roundhay (W. B. Turner). Baildon. Hawksworth Springs. Malham Tarn.

N.W.—Mickle Fell.

N.E.—Whitby. Seamer. Rievaulx Abbey. Strensall (W. B. Turner).

S.E.—Near Hull (G. Norman).

Var. **media** Van Heurck.

MID W.—Hawksworth Springs. Penyghent.

S.E.—Market Weighton.

1009. **Nitzschia Sigmoidea** (Ehrenb.) W. Sm.

S.W.—Abundant in the Bradford, Halifax, and Keighley districts. Cusworth and Hatfield districts; Firsby reservoir; Rossington (M. H. Stiles). Askern; Hatfield Chase (J. M. Kirk). Roche Abbey (J. N. Coombe). Doncaster. Wibsey. Allerton.

MID W.—Malham Cove (J. M. Kirk). Arthington. Bolton Woods. Staveley Dam, near Knaresborough. Whernside.

N.W.—Dodd Fell. Mickle and Cronkley Fells.

N.E.—Seamer. Near Scarborough. Malton. Carlton Bank.

S.E.—Beverley. Routh. Market Weighton. Skipwith Common. Cottingham; Risby Pond; Wawne; Haltenprice; Spring Ditch; Beverley (G. Norman).

1010. **Nitzschia vermicularis** (Kütz.) Grun.

S.W.—Hatfield district (M. H. Stiles).

1011. **Nitzschia Brébissonii** W. Sm.

MID W.—Gordale.

S.E.—Near Stoneferry (G. Norman).

1012. **Nitzschia Sigma** (Kütz.) W. Sm.

S.W.—Goole (J. Harrison).

1013. **Nitzschia curvula** (Ehrenb.) W. Sm.

S.W. — Doncaster town water (M. H. Stiles). Allerton. Cullingworth.

MID W.—Adel Bog. Cocket Moss, near Giggleswick.

N.E.—Rievaulx Abbey.

S.E.—Stoneferry to Sutton (R. Harrison). Routh. Beverley. Waghen.

1014. **Nitzschia fasciculata** Grun.

S.W.—Hatfield district (M. H. Stiles).

1015. **Nitzschia obtusa** W. Sm.

Var. **scalpelliformis** Grun.

S.E.—Loftsome Bridge, near Wressle.

Var. **nana** Grun.

MID W.—Hawksworth Springs.

S.E.—Skipwith Common.

1016. **Nitzschia linearis** (Ag.) W. Sm.

S.W.—Hatfield district (M. H. Stiles). Goole. Doncaster. Woolley. Denholme. Farnley. Shipley. Frizinghall.

MID W.—Holden Gill, near Keighley. Gordale. Above Eldwick. Boston Spa. Cray Moss. Baildon.

N.W.—Jervaulx Abbey. Mickle Fell.

N.E.—Hayburn Wyke. Saltburn.

S.E.—Beverley. Tickton. Routh. Near Meaux Abbey. Haltenprice; Cottingham (G. Norman).

Var. **tenuis** (W. Sm.) Grun. [Syn. *N. tenuis* W. Sm.].

S.W.—Bradford. Chellow Dean. Allerton. Doncaster. Cragg Vale, towards Blackstone Edge.

MID W.—Moughton Fell. Gordale. Pond at Pool.

N.E.—Rievaulx Abbey. Malton.

S.E. — Beverley. Newsholme. Loftsome Bridge, near Wressle. Tickton. Routh. Market Weighton. Haltenprice; Spring Ditch; Cottingham (G. Norman).

1017. **Nitzschia vitrea** Norman.

S.E.—Near Stoneferry in brackish ditch (G. Norman).

Var. **recta** (Hantzsch) V.H.

S.W.—Hatfield district (M. H. Stiles).

1018. **Nitzschia lanceolata** W. Sm.

S.W.—Roche Abbey (E. Hunter). Near Mirfield.

MID W.—Roundhay; South Milford; Killingbeck (W. B. Turner).

N.E.—Strensall! (W. B. Turner).

1019. **Nitzschia Palea** (Kütz.) W. Sm.

S.W.—Hatfield district (M. H. Stiles). Allerton. Crimsworth Dean. Cragg Vale, towards Blackstone Edge. Marley, near Bingley.

MID W.—Rombald's Moor. Boston Spa. Near Buckden. Bog, two miles south of Clapham. Malham Tarn Bog. Moughton Fell.

N.W.—Mickle Fell.

N.E.—Pilmoor, near Thirsk. Ingleby Greenhow. Saltburn.

S.E.—Market Weighton. Wressle. Newsholme, near Howden. Cottingham; Stoneferry (G. Norman).

Var. **fonticola** Grun.

MID W.—Baildon. Harrogate.

Var. **debilis** V.H.

S.W.—Saltaire. Cullingworth.

MID W.—Rombald's Moor.

N.W.—Jervaulx Abbey.

Var. **tenuirostris** V.H.

S.W.—Horton Park, Bradford. Near Shipley.

N.W.—Jervaulx Abbey.

1020. **Nitzschia communis** Rabenh.

S.W.—Allerton. Horton Park, Bradford.

N.W.—Jervaulx Abbey.

1021. **Nitzschia amphibia** Grun.

S.W.—Near Bingley.

N.W.—Mickle Fell.

1022. **Nitzschia longissima** (Bréb.) Ralfs.

Var. **Closterium** (W. Sm.) V.H.

[Syn. *N. Closterium* W. Sm.].

S.E.—Beverley.

Var. **reversa** (W. Sm.) V.H. [Syn. *N. reversa* W. Sm.].

S.E.—Ditch near Stoneferry (G. Norman).

1023. **Nitzschia Smithii** Ralfs. [Syn. *N. spectabilis* W. Sm. non *N. spectabilis* (Ehrenb.) Ralfs].

S.E.—Rare in a brackish ditch near Stoneferry (G. Norman).

1024. **Nitzschia acicularis** (Kütz.) W. Sm.

[Syn. *Nitzschiella acicularis* Rabenh.].

S.W.—Hatfield district (M. H. Stiles). Mirfield.

MID W.—Austwick. Adel Bog. Pond at Pool. Hawksworth. Bolton Woods. Boston Spa.

N.W.—Mickle Fell. Dalton.

N.E.—Whitby. Seamer. Scalby Beck. Saltburn. Carlton Bank.

S.E.—Routh. Near Sutton. Beverley. Loftsome Bridge, near Wressle. Newsholme. Dairycoats; Cottingham (G. Norman).

1025. **Nitzschia gracilis** (Bréb.).

[Syn. *Nitzschiella gracilis* (Bréb.) Rabenh.].

MID W.—Roundhay (W. B. Turner).

S.E.—Waghen.

GENUS CYLINDROTHECA Rabenh., 1859.

1026. **Cylindrotheca gracilis** (Bréb.) Grun.

[Syn. *Nitzschia Tænia* W. Sm.].

S.E.—Marfleet Clough (pure) (G. Norman).

ORDER CRYPTORAPHIDIEÆ.

FAMILY *MELOSIREÆ.*

GENUS MELOSIRA Ag., 1824.

1027. **Melosira nummuloides** (Bory) Ag.

S.W.—Goole (E. Hunter).

S.E.—Dairycoats; ditch near Stoneferry (G. Norman).

1028. **Melosira varians** Ag.

S.W.—'Common' in the millstone grit districts. 'Abundant.' Roche Abbey (M. H. Stiles; J. N. Coombe). Fixby. Heaton. Askern and Hatfield districts; Doncaster (!) town water; Firsby reservoirs; Rossington (M. H. Stiles). Farnley.

MID W.—Arthington. Leathley. Baildon. Bolton Woods. Otley. Staveley Dam, near Knaresborough. Harrogate; Ripley (G. Norman).

N.W.—Jervaulx Abbey. Masham.

N.E.—'Frequent.' Scalby Beck. Carlton Bank.

S.E.—Beverley. Newsholme. Haltenprice (pure and with sporangia); Spring Ditch; Cottingham; Wawne; Reservoir Waterworks, Hull; Hornsea Peat Deposit (G. Norman).

1029. **Melosira distans** Kütz.

Var. **nivalis** (W. Sm.) V.H. [Syn. *M. nivalis* W. Sm.].

MID W.—Gilstead.

N.E.—Lockton.

1030. **Melosira Arenulata** Kütz.

[Syn. *M. orichalcea* W. Sm.].

S.W.—Very rare, in a boggy puddle, Thorne Moor (G. Norman). Plentiful near Marsden.

N.W.—Rokeby.

1031. **Melosira arenaria** Moore.

S.W.—Roche Abbey (M. H. Stiles).

MID W.—Baildon. Gordale. Holden Gill, near Keighley. Kildwick.

N.E.—Near Scarborough. Rievaulx Abbey.

S.E.—Newbald; Hornsea Peat Deposit; Hull (G. Norman).

1032. **Melosira granulata** (Ehrenb.) Ralfs.

[Syn. *Orthosira punctata* W. Sm.].

S.W.—Chellow Dean.

S.E.—Hornsea Peat Deposit; in brackish ditch, Stoneferry to Sutton (G. Norman).

1033. **Melosira Roesiana** Rabenh.

[Syn. *Orthosira spinosa* W. Sm.].

S.W.—On wet rocks near Bingley.

S.E.—Hornsea Peat Deposit (G. Norman).

1034. **Melosira Jurgensii** Ag.

[Syn. *M. subflexilis* Kütz.].

S.E.—Brackish water ditch running from Stoneferry to Sutton (pure) (G. Norman).

GENUS CYCLOTELLA Kütz., 1833.

1035. **Cyclotella comta** (Ehrenb.), Kütz.

S.W.—Doncaster town water (M. H. Stiles).

1036. **Cyclotella operculata** Kütz.

S.W.—Cusworth district; Doncaster town water (M. H. Stiles). Goole (E. Hunter). Near Bradford.

MID W.—Ripley (G. Norman). Roundhay (J. Abbott). Staveley Dam, near Knaresborough. Moughton Fell. Arthington.

S.E.—Spring Ditch; Cottingham (G. Norman). Loftsome Bridge, near Wressle. Skipwith Common.

1037. **Cyclotella Meneghiniana** Kütz.

MID W.—Baildon.

N.E.—Carlton Bank.

1038. **Cyclotella minutula** Kütz.

S.E.—Hornsea Peat Deposit (G. Norman).

1039. **Cyclotella Kützingiana** Chauvin.

S.W.—Askern, Cusworth, and Hatfield districts (M. H. Stiles). Roche Abbey (J. N. Coombe; M. H. Stiles). Doncaster. Cullingworth.

N.E.—Near Scarborough, abundant (vi. 1896). Carlton Bank.

S.E.—Spring Ditch; Cottingham; Stoneferry; Market Weighton Canal; Wawne (G. Norman).

1040. **Cyclotella Astræa** (Ehrenb.) Kütz.

[Syn. *C. rotula* Kütz.].

S.E.—Market Weighton Canal; Hornsea Peat Deposit (G. Norman).

FAMILY *COSCINODISCIDEÆ.*

GENUS COSCINODISCUS Ehrenb., 1838.

1041. **Coscinodiscus lacustris** Grun.

[Syn. *Cyclotella punctata* W. Sm.].

S.E.—Market Weighton Canal, near the River Foulney, attached to *Myriophyllum* and *Potamogeton* (G. Norman; Grunow).

1042. **Coscinodiscus radiatus** Ehrenb.

S.E.—Market Weighton Canal; Reservoir Waterworks, Hull (G. Norman). Usually marine.

ADDENDA.

GENUS COSMARIUM Corda, 1834.

1043. **Cosmarium subreniforme** Nordst. in Öfvers. af K. Vet. Akad. Förh. 1875, no. 6, p. 24, t. vii., f. 16.

N.E. Strensall Common.

This species has not previously been recorded for the British Isles.

GENUS TETRAGONIUM West & G. S. West, 1896.

1044. **Tetragonium lacustre** West & G. S. West, in Journ. Roy. Micr. Soc., 1896, p. 160, t. ii., f. 1—13.

S.W.—Shelf: abundant in pools.

This plant is known elsewhere from Surrey and Lancashire.

The following is a summary of the known algæ of Yorkshire:—

	Genera.	Species.
Class FLORIDEÆ.		
Fam. BATRACHOSPERMEÆ	2	7
Fam. HILDENBRANDTIACEÆ	1	1
Fam. LEMANEACEÆ	1	2
Class FUCOIDEÆ.		
Fam. HYDRURACEÆ	1	1
Class CHLOROPHYCEÆ.		
Ord. *CONFERVOIDEÆ HETEROGAMÆ.*		
Fam. COLEOCHÆTACEÆ	2	6
Fam. ŒDOGONIACEÆ	2	30
Fam. CYLINDROCAPSACEÆ	1	1
Ord. *CONFERVOIDEÆ ISOGAMÆ.*		
Fam. ULVACEÆ	3	3
Fam. ULOTRICHACEÆ.		
Sub-fam. ULOTRICHEÆ	7	14
Sub-fam. CHÆTOPHOREÆ	7	15
Fam. CONFERVACEÆ	3	16
Fam. CHROOLEPIDACEÆ	3	4
Fam. CLADOPHORACEÆ	3	6
Ord. *CONJUGATÆ.*		
Fam. ZYGNEMACEÆ.		
Sub-fam. MESOCARPEÆ	1	10
Sub-fam. ZYGNEMEÆ	4	30
Fam. DESMIDIACEÆ	23	383
Ord. *SIPHONEÆ.*		
Fam. VAUCHERIACEÆ	1	7
Fam. HYDROGASTRACEÆ	1	1
Ord. *PROTOCOCCOIDEÆ.*		
Fam. VOLVOCINEÆ	8	10
Fam. PALMELLACEÆ		
Sub-fam. CŒNOBIEÆ	6	20
Sub-fam. PSEUDOCŒNOBIEÆ	1	1
Sub-fam. RHAPHIDIEÆ	7	32
Sub-fam. CHARACIEÆ	2	10
Sub-fam. ENDOSPHÆREÆ	1	1
Sub-fam. TETRASPOREÆ	6	11
Sub-fam. DICTYOSPHÆRIEÆ	4	7
Sub-fam. GLŒOCYSTIDÆ	7	24
Sub-fam. PROTOCOCCACEÆ	5	16

	Genera.	Species.
Class **MYXOPHYCEÆ.**		
Ord. *HORMOGONEÆ.*		
Sub-ord. *HETEROCYSTEÆ.*		
Fam. RIVULARIACEÆ	4	7
Fam. SIROSIPHONIACEÆ	2	8
Fam. SCYTONEMACEÆ	4	8
Fam. NOSTOCACEÆ	4	18
Sub-ord. *HOMOCYSTEÆ.*		
Fam. VAGINARIEÆ	1	3
Fam. LYNGBYEÆ		
Sub-fam. LYNGBYOIDEÆ	3	10
Sub-fam. OSCILLATORIOIDEÆ	4	24
Sub-fam. SPIRULINOIDEÆ	1	2
Ord. *CHAMÆSIPHONACEÆ*	1	1
Ord. *CHROOCOCCOIDEÆ.*		
Fam. CHROOCOCCACEÆ		
Sub-fam. CHROOCYSTEÆ	1	2
Sub-fam. EUCHROOCOCCACEÆ	15	44
Class **BACILLARIEÆ.**		
Ord. *RAPHIDIEÆ.*		
Fam. CYMBELLEÆ	3	28
Fam. NAVICULEÆ	9	93
Fam. GOMPHONEMEÆ	2	15
Fam. ACHNANTHEÆ	3	10
Ord. *PSEUDORAPHIDIEÆ.*		
Fam. EPITHEMIEÆ	3	23
Fam. SYNEDREÆ	2	10
Fam. FRAGILARIEÆ	1	5
Fam. MERIDIONIDÆ	1	1
Fam. DIATOMEÆ	2	6
Fam. TABELLARIEÆ	2	4
Fam. SURIRELLEÆ	3	11
Fam. NITZSCHIEÆ	3	34
Ord. *CRYPTORAPHIDIEÆ.*		
Fam. MELOSIREÆ	2	14
Fam. COSCINODISCIDEÆ	1	2
TOTAL ...	189	1044

Some ten or a dozen species which have at different times been recorded for the county are much too doubtful and uncertain for inclusion in this flora.

INDEX.

—:—

In this Index, which has been compiled by Mr. W. Denison Roebuck, F.L.S., are given all names of classes, orders, sub-orders, families, sub-families, genera, sub-genera, species, sub-species, varieties, and forms, with most of the specific synonyms, but no attempt is made to discriminate in the Index between species, varieties, and synonyms, nor to indicate the authorship of the various names. In short, the Index is simply an Index of Names.

INDEX.

	page
abbreviata, Microspora ...	27
abbreviatum, Cosmarium ...	92
abruptum, Closterium ..	54
—— Cosmarium ...	92
abundans, Scenedesmus ...	120
acarides, Staurastrum ...	108
acerosum, Closterium ...	52
Achnantheæ, Family ...	187
Achnanthes, Genus	187
Achnanthidium, Genus ...	187
aciculare, Closterium ...	54
—— Rhaphidium ...	121
acicularis, Nitzschia... ...	216
—— Synedra	196
aciculifera, Trochiscia ...	136
aciculiferum, Staurastrum ...	98
acrosphæria, Navicula ...	168
acrosporum, Œdogonium ...	16
aculeatum, Staurastrum ...	106
—— Xanthidium ...	68
acuminata, Navicula ...	170
—— Nitzschia ...	212
acuminatum, Characium ...	126
—— Gomphonema ...	184
—— Pleurosigma ...	182
—— Selenastrum ...	123
Acus, Synedra	198
acuta, Navicula	171
—— Spirotænia	41
—— Stauroneis	164
acutiformis, Scenedesmus ...	121
acutius, Desmidium... ...	110
acutum, Closterium	56
—— Staurastrum ...	103
acutus, Scenedesmus ...	119
ægagropila, Cladophora ...	31
—— Tolypothrix ...	140
æqualis, Hormiscia	20
—— Synedra	198
æruginea, Merismopedia ...	154
ærugineo-cœrulea, Lyngbya ...	145
æruginosa, Clathrocystis ...	155
—— Gloeocapsa ...	156
æruginosus, Synechococcus ...	153
affine, Euastrum	61
affinis, Amphora	159
—— Conferva	26
—— Cymbella	160
—— Navicula	179
—— Synedra	199
Agardhianum, Nephrocytium...	130
Agardhii, Zygnema	35
Ahlstrandii, Œdogonium ...	17
alata, Amphiprora	183
alatum, Cosmarium	86
—— Scytonema	139
allantoideum, Nephrocytium ..	131
Allmani, Urococcus... ...	134
alpestris, Epithemia... ...	191
alpina, Navicula	167
alpinum, Staurastrum ...	99
alternans, Staurastrum ...	101
ambigua, Navicula	176
Americana, Micrasterias ...	67
amœbo-granulosum, Cosmarium	84
amœbum, Cosmarium ...	84
amœnum, Cosmarium ...	88
—— Staurastrum ...	107
amphibia, Nitzschia ...	215
—— Oscillatoria ...	149
amphicephala, Epithemia ...	191
—— Synedra ...	199
Amphigomphus, Navicula ...	178
Amphioxys, Ceratoneis ...	196
—— Hantzschia ...	210
Amphipleura, Genus ...	181
Amphiprora, Genus... ...	183
Amphirhynchus, Navicula ...	178
—— Synedra ...	198
Amphisbœna, Navicula ...	177
Amphithrix, Genus... ...	137
Amphora, Genus	158

	page
ampla, Glœocystis	132
ampullaceum, Euastrum ...	61
Anabæna, Genus	142
anceps, Cosmarium	90
—— Diatoma	203
—— Stauroneis	164
anglica, Navicula	173
anguina, Oscillatoria ...	150
angulatum, Cosmarium ...	69
angulosum, Cosmarium ...	93
—— Pediastrum ...	116
angulosus, Pleurococcus ...	135
angusta, Mougeotia	32
—— Surirella	208
angustata, Navicula... ...	172
—— Nitzschia... ...	211
angustatum, Closterium ...	54
—— Cosmarium ...	79
—— Gomphonema ..	186
angustum, Closterium ...	49
anisochondrum, Cosmarium ...	76
anomalum, Zygnema ...	34
ansatum, Euastrum	62
antennatus, Scenedesmus ...	119
antiacerosum, Closterium .	53
antilaria, Oscillatoria ..	148
antilopæum, Xanthidium ...	67
Aphanizomenon, Genus ...	143
Aphanocapsa, Genus ...	156
Aphanochæte, Genus ...	14
Aphanothece, Genus ...	152
apiculata, Cymatopleura ...	206
—— Micrasterias ...	66
—— Nitzschia... ...	212
—— Surirella	208
apiculatum, Staurastrum ...	96
Apiocystis, Genus	128
aponina, Gomphosphæria ...	1 5
appendiculata, Navicula ...	169
aptogonum, Desmidium ...	110
aquaticum, Zygnema ...	35
arbuscula, Ophiocytium ..?	27
Arachne, Staurastrum ...	108
Archerii, Cosmarium ...	80
arcticum, Staurastrum ...	102
arcuatum, Closterium ...	49
Arcus, Ceratoneis	196
—— Eunotia	192
arenaria, Glœocapsa ...	156
—— Melosira	217
arenulata, Melosira	217
Argus, Epithemia	191
aristiferum, Staurastrum ...	96
armatum, Xanthidium ...	67
armigerum, Staurastrum ...	98
Arnellii, Staurastrum ...	103
Arthrodesmus, Genus ...	108
Arthrospira, Genus	151
articulata, Echinella ...	138
asperum, Staurastrum ...	107
asphærosporum, Cosmarium ...	74
Asterionella, Genus... ...	199
Astræa, Cyclotella	218
asymmetrica, Oocystis ...	132
atrum, Batrachospermum ...	12
attenuata, Oscillatoria ...	150
attenuatum, Closterium ...	55
—— Cosmarium ...	95
—— Pleurosigma ...	181
Augur, Gomphonema ...	184
aurea, Trentepohlia... ...	28
aureus, Urococcus	134
—— Volvox	113
australianum, Cosmarium ...	84
autumnale, Phormidium ...	148
aversa, Vaucheria	112
Avicula, Staurastrum ...	97
Bacillarieæ, Class	158
bacillaris, Stichococcus ...	134
—— Navicula	179
bacillum, Navicula	179
baculum, Docidium... ...	58
Badense, Cosmarium ...	75
badio-purpureus, Chroococcus	158
balearica, Calothrix	137
barbata, Schrammia ...	151
Batrachospermeæ, Family ...	12
Batrachospermum, Genus ...	12
Beanlandii, Cosmarium ...	81
Biasolettiana, Achnanthes ...	189
—— Rivularia ...	138
bicapitata, Eunotia	195
—— Navicula	169
bicaudatus, Dactylococcus ...	119
bicolor, Conferva	21
bicornis, Glœochæte ...	152
bicuspidatum, Ophiocytium ...	28
bidens, Eunotia ... 192	194
bidentatum, Euastrum ...	62
bidentulum, Pediastrum ...	117
Bieneanum, Staurastrum ...	101
bifidus, Arthrodesmus ...	109
biforme, Cosmarium ...	85
bijugatus, Scenedesmus ...	119
bilobata, Nitzschia	212
bilunaris, Eunotia	195
binale, Euastrum	64
binodis, Fragilaria	201
—— Navicula	179
bioculatum, Cosmarium ...	73
biplex, Rhaphidium... ...	123
biradiatum, Pediastrum ...	117

	page
biretum, Cosmarium ...	88
biseriata, Surirella	206
Blyttii, Cosmarium	77
Bœckii, Cosmarium	77
—— Cymbella	160
Boldtiana, Cosmarium ...	87
Boldtii. Cosmarium... ...	82
bombycina, Conferva ...	25
borealis, Navicula	167
Borgeanum, Staurastrum ...	106
Börgesenii, Cosmarium ...	76
Borreri, Desmidium ...	111
Boryanum, Pediastrum ...	116
Boscii, Œdogonium ...	16
Botrydina, Genus	129
Botrydium. Genus	113
Botryococcus, Genus ...	129
botryoides, Glæocystis ...	133
—— Protococcus ...	136
—— Tetracoccus ...	129
Botrytis, Cosmarium ...	82
Brachiatum, Staurastrum ...	103
Brasiliense, Staurastrum ...	107
Brauniana, Apiocystis ...	128
Braunii, Botryococcus ...	129
—— Dactylothece ...	134
—— Mesotænium ...	41
—— Œdogonium ...	16
Brébissonii, Bambusina ...	111
—— Cosmarium ...	71
—— Cylindrocystis ..	43
—— Gonatozygon ...	39
—— Navicula ...	167
—— Nitzschia ...	213
—— Tetmemorus ...	59
—— Xanthidium ...	68
brevior, Closterium	54
brevis, Staurastrum	106
brevispinum, Staurastrum ...	97
Brightwellii, Surirella ...	209
Broomei, Cosmarium ...	88
bryophila, Spirotænia ...	40
Bulbochæte, Genus. ...	15
bullosa, Tetraspora	128
bullosum, Staurastrum ...	99
cæspitosa, Vaucheria ...	112
cæspitosum, Encyonema ...	162
calcarea, Zonatrichia ...	137
calcareum, Œdogonium ...	16
calcareus, Botryococcus ...	129
calcicola, Schizothrix ...	144
caldariorum, Glœocapsa ...	156
—— Mesotænium ...	42
Calocylindrus, Genus ...	37
calospora, Debarya	33
Calothrix, Genus	137

	page
cambricum, Cosmarium ...	82
Campylodiscus, Genus ...	210
capitata, Synedra	199
capitatum, Gomphonema ...	184
capitulum, Staurastrum ...	107
capucina, Fragilaria... ...	200
—— Mougeotia ...	33
cardinalis, Navicula... ...	166
Castagnei, Aphanocapsa ...	156
catæniformis, Hormiscia ...	20
—— Spirogyra ...	37
catenatum, Cylindrospermum	143
caudatum, Tetraëdron ...	124
celatum, Cosmarium ...	77
Cerasterias, Genus	125
ceratium, Closterium ...	56
Ceratoneis, Genus	196
Chætomorpha, Genus ...	30
Chætophora, Genus... ...	23
Chætophoreæ, Sub-Family ...	22
Chætospheridium, Genus ...	22
chalybea, Chantransia ...	12
—— Oscillatoria ...	150
Chamæsiphonaceæ, Order ...	151
Chamæsiphoneæ, Family ...	151
Chantransia, Genus... ...	12
Characieæ, Sub-Family ...	125
Characium, Genus	125
Chlamydomonas, Genus ...	114
chlamydosporum, Mesotænium	42
Chlorochytrium, Genus ...	127
Chlorophyceæ, Class ...	14
Choaspis, Genus	38
Chodatella, Genus	123
Chroococcaceæ, Family ...	151
Chroococcoideæ, Order ...	151
Chroococcus, Genus ...	157
Chroocysteæ, Sub-Family ...	151
Chroolepidaceæ, Family ...	28
Chroothece, Genus	152
ciliata, Oocystis	123
ciliatum, Œdogonium ...	16
circinalis, Anabæna ...	142
circulare, Cosmarium ...	68
—— Euastrum ...	61
—— Meridion ...	201
circumsuta, Nitzschia ...	212
Cistula, Cymbella	161
Cladophora, Genus	30
Cladophoraceæ, Family ...	30
Clathrocystis, Genus ...	155
clavata, Pleurotænium ...	58
Clonothrix, Genus	148
closterioides, Penium ...	45
Closterium, Genus	48
—— Nitzschia ...	216

	page
coactilis, Tolypothrix ...	140
coarctata, Achnanthes ...	187
cochleare, Ophiocytium ...	27
Cocconeis, Genus	189
Cœlastrum, Genus	115
cœlatum, Cosmarium ...	70
Cœlosphærium, Genus ...	155
Cœnobieæ, Sub-Family ...	115
cœruleum, Nostoc	142
cohærens, Chroococcus ...	157
Cohniella, Genus	118
Coleochætaceæ, Family ...	14
Coleochæte, Genus	14
Colletonema, Genus ...	180
commissurale, Cosmarium ...	71
commune, Nostoc	141
communis, Nitzschia ...	215
—— Spirogyra ...	36
commutata, Navicula ...	166
commutatum, Gomphonema ...	184
comta, Cyclotella	218
concinnum, Xanthidium ...	68
condensata, Spirogyra ...	38
—— Spirotænia ...	39
Conferva, Genus	25
Confervaceæ, Family ...	25
confervicola, Mischococcus ...	118
Confervoideæ Heterogamæ, Order	14
—— Isogamæ, Order	17
confluens, Gloeothece ...	152
confusum, Cosmarium ...	75
Conjugatæ, Order	31
connatum, Cosmarium ...	87
—— Staurastrum ...	96
conspersum, Cosmarium ...	88
constricta, Amphiprora ...	183
—— Cylindrocystis ...	44
—— Cymatopleura ...	205
—— Nitzschia ...	211
—— Surirella... ...	207
constrictum, Cosmocladium ...	95
—— Gomphonema ...	183
—— Meridion ...	202
—— Pediastrum ...	116
construens, Fragilaria ...	200
contortum, Staurastrum ...	104
contractum, Cosmarium ...	74
convergens, Arthrodesmus ...	108
controversum, Staurastrum ...	106
convolutum, Rhaphidium ...	122
Corbula, Cosmarium ...	76
Cordanum, Closterium ...	51
Corium, Phormidium ...	147
Cornu, Closterium	53
cornubiense, Staurastrum ...	98
cornu-damæ, Chætophora ...	23

	page
coronatum, Gomphonema ...	184
—— Pleurotænium ...	58
Coscinodisceæ, Family ...	219
Coscinodiscus, Genus ...	219
Cosmarioides, Staurastrum ...	103
Cosmarium, Genus ... 68	220
Cosmocladium, Genus ...	95
costatum, Closterium ...	54
costatus, Campylodiscus ...	210
costatus, Scenedesmus ...	121
crassa, Cylindrocystis ...	43
—— Oocystis	131
—— Spirogyra	38
crassicolle, Euastrum ...	65
crassinervia, Vanheurckia ...	180
crassiusculum, Penium ...	47
crassula, Denticula	204
crassum, Euastrum	60
—— Pleurotænium ...	59
crassus, Synechococcus ...	153
Craticula, Surirella	210
crenata, Micrasterias ...	66
crenatum, Cosmarium ...	89
crenulata, Melosira	217
crenulatum, Cosmarium ...	92
—— Staurastrum ...	105
crispa, Prasiola	18
crispata, Cladophora ...	30
cristatum, Gomphonema ...	184
—— Staurastrum ...	98
— — Xanthidium ...	67
cruciatum, Staurastrum ...	105
—— Zygnema ...	34
crucicula, Navicula	175
—— Stauroneis ...	175
cruciferum, Penium... ...	47
Crucigenia, Genus	117
cruentum, Porphyridium ...	156
Crumena, Surirella ...	209
crustacea, Rivularia... ..	130
Crux-melitensis, Micrasterias...	67
cryptocephala, Navicula ...	172
cryptoporum, Œdogonium ...	15
Cryptoraphidieæ, Order ...	216
cubicum, Cœlastrum ...	115
Cucumis, Closterium ...	50
—— Cosmarium ...	69
Cucurbita, Cosmarium ...	94
cucurbitinum, Penium ...	47
cuneatum, Euastrum ...	62
curtum, Penium	47
curvata, Rhoicosphenia ...	187
curvula, Nitzschia	214
cuspidata, Cymbella ...	159
—— Navicula	176
cuspidatum, Staurastrum ...	97

	page
cyathigerum, Œdogonium ...	16
cyclicum, Cosmarium ...	69
Cyclotella, Genus	218
cylindricum, Desmidium ...	110
Cylindrocapsa, Genus ...	17
Cylindrocapsaceæ, Family ...	17
Cylindrocystis, Genus ...	43
Cylindrospermum, Genus ...	143
Cylindrotheca, Genus ...	216
cylindrus, Penium	44
Cymatopleura, Genus ...	205
cymatopleurum, Cosmarium ...	80
Cymbella, Genus	159
Cymbelleæ, Family... ...	158
cymbiformis, Cymbella ...	160
Cynthia, Closterium... ...	51
Cyprinus, Navicula	173
cyrtocerum, Staurastrum ...	104
cystifera, Glœothece ...	152
Dactylococcopsis, Genus ...	153
Dactylococcus, Genus ...	118
Dactylothece, Genus ...	134
Dactylus, Navicula	165
Dansei, Mastogloia	163
Davidsonii, Cosmarium ...	81
Debarya, Genus	33
DeBaryi, Cosmarium ...	90
debilis, Nitzschia	215
decedens, Cosmarium ...	90
decorum, Closterium ...	51
DeGreyii, Mesotænium ...	41
dejectum, Staurastum ...	96
delicatissima, Synedra ...	198
delicatula, Cymbella ...	160
—— Schizochlamys ...	128
delicatulum, Œdogonium ...	17
—— Staurastrum ...	99
Denticula, Genus	204
—— Nitzschia... ...	212
denticulata, Micrasterias ...	66
denticulatum, Euastrum ...	64
—— Staurastrum ...	98
denticulatus, Scenedesmus ...	120
depressa, Mougeotia ...	33
depressum, Spondylosium 95	96
Desmidiaceæ, Family ...	39
Desmidium, Genus	110
DeTonii, Staurastrum ...	98
devia, Glœothece	152
diagonum, Aptogonum ...	110
Dianæ, Closterium	48
Diatoma, Genus	202
Diatomeæ, Family	202
dicephala, Navicula... ...	174
dichotoma, Vaucheria ...	112
dichotomum, Gomphonema ...	185
Dickiei, Staurastrum ...	97
Dictyosphærieæ, Sub-Family...	129
Dictyosphærium, Genus ...	130
didelta, Euastrum	61
didyma, Glœocapsa	155
didymochondrum, Cosmarium	84
didymotocum, Closterium ...	53
didymum, Zygnema ...	35
difficile, Cosmarium ...	93
digitato-radiata, Navicula ...	173
Digitus, Penium	44
dilatata, Stauroneis	175
dilatatum, Staurastrum ...	101
dimorphus, Scenedesmus ...	119
diodon, Eunotia	195
Diplocolon, Genus	140
diplosiphon, Microchæte ...	139
diplospora, Cylindrocystis ...	44
directum, Closterium ...	55
Dirhynchus, Navicula ...	173
dissectus, Stichococcus ...	135
dissiliens, Hyalotheca ...	111
dissipata, Nitzschia	213
distans, Melosira	217
distorta, Tolypothrix ...	139
divergens, Navicula... ...	167
—— Staurastrum ...	97
Docidium, Genus	58
dovrense, Cosmarium ...	70
Draparnaudia, Genus ...	23
dubia, Hormospora	21
—— Nitzschia	211
duplex, Pediastrum... ...	116
—— Rhaphidium ...	122
eboracense, Closterium 50	55
—— Cosmarium 82	88
—— Staurastrum 105	108
eboracensis, Spirotænia ...	40
ecdysiscepanum, Nephrocytium	131
echinulata, Rivularia ...	138
ecornis, Scenedesmus ...	119
Ehrenbergianum, Dictyosphærium	130
Ehrenberghii, Closterium ...	51
—— Pleurotænium ...	58
Ehrenbergii, Cymbella ...	159
—— Desmidium ...	110
—— Diatoma ...	203
—— Pediastrum ...	117
elabens, Polycystis	155
elasticha, Sphærozyga ...	142
elegans, Chætophora ...	23
—— Denticula	204
—— Euastrum ... 62	63
—— Eudorina	113
—— Navicula	175
—— Surirella	207

	Page
elegantissimum, Cosmarium ...	94
elliptica, Cymatopleura ...	205
—— Navicula	174
—— Oocystis	132
ellipticum, Cosmarium ...	86
elobatum, Euastrum ...	64
elongata, Anabæna	142
elongatum, Diatoma ...	202
Encyonema, Genus	162
endivæfolia, Chætophora ...	23
Endlicherianum, Mesotænium	42
Endosphæreæ, Sub-Family ...	127
enorme, Tetraëdron... ...	124
ensiforme, Characium ...	126
Enteromorpha, Genus ...	17
Epithemia, Genus	190
Epithemieæ, Family ...	190
Eremosphæra, Genus ...	135
ericetorum, Zygnema ...	35
erosum, Cosmarium... ...	71
—— Euastrum	63
Etchachanense, Cosmarium ...	72
Euastrum, Genus	60
Euchroococcaceæ, Sub-Family	152
Eudorina, Genus	113
Eunotia, Genus	192
excavatum, Cosmarium ...	86
—— Sphærozosma ...	110
exigua, Eunotia	193
exiguum, Penium	44
exilis, Achnanthes	188
—— Dactylococcus ...	119
—— Navicula	177
Faba, Eunotia	194
falcatum, Rhaphidium ...	121
famelica, Synedra	199
fasciculata, Nitzschia ...	214
—— Synedra... ...	199
fasciculatum, Xanthidium 67	68
fastigiatum, Stigeoclonium ...	24
fenestrata, Tabellaria ...	204
figuratum, Scytonema ...	139
filiforme, Onychonema ...	109
fimbriata, Micrasterias ...	66
firma, Navicula	178
flaccida, Tolypothrix ...	140
flaccidus, Stichococcus ...	135
flavescens, Cladophora ...	31
—— Œdogonium ...	16
—— Spirogyra ...	36
flavicans, Rhizoclonium ...	30
flexellum, Achnanthidium ...	187
flexuosa, Eunotia	195
floccosa, Microspora ...	26
flocculosa, Tabellaria ...	204
Florideæ, Class	12
Flos-aquæ, Anabæna ...	142
—— Aphanizomenon ...	143
—— Polycystis ...	155
fluviatilis, Hildenbrandtia ...	13
—— Lemanea... ...	13
—— Zonatrichia ...	137
follis, Navicula	177
fonticola, Nitzschia	215
fontinalis, Microspora ...	27
formosa, Asterionella ...	109
—— Oscillatoria ...	150
formosulum, Cosmarium ...	78
foveolarum, Phormidium ...	148
fracta, Rhoicosphenia ...	187
Fragilaria, Genus	200
Fragilarieæ, Family... ...	200
fragilis, Stichococcus ...	135
Frœlichii, Oscillaria... ...	149
frustulosa, Glæocystis ...	133
Fucoideæ, Class	13
fugacissima, Microspora ...	27
Funkii, Conferva	27
furcatum, Staurastrum ...	98
furcigerum, Staurastrum ...	98
fusiformis, Spirotænia ...	40
galeritum, Cosmarium ...	74
Gallica, Navicula	180
garganica, Navicula... ...	177
gastroides, Cymbella ...	160
—— Navicula... ...	175
Gastrum, Navicula	173
gelatinosa, Schizochlamys ...	127
—— Tetraspora ...	128
geminata, Vaucheria ...	112
geminatum, Gomphonema ...	183
Geminella, Genus	21
—— Cylindrocapsa ..	17
gemmatum, Euastrum ...	65
genuflexa, Mougeotia ...	31
gibba, Epithemia	190
—— Navicula	168
gibberula, Navicula... ...	178
—— Epithemia ...	192
giganteum, Œdogonium ...	16
giganteus, Chroococcus ...	157
gigas, Glæocystis	132
—— Oocystis	132
—— Tetraëdron	124
glabrum, Staurastrum ..	97
gladiosum, Staurastrum ...	99
Glæocystidæ, Sub-Family ...	130
Glæocystis, Genus	132
glanduliferum, Pediastrum ...	116
glauca, Merismopedia ...	154
glaucescens, Tetrapedia ...	154
Glaucocystis, Genus ...	154

	page
globator, Volvox	113
globosa, Aphanochæte ...	22
—— Nordstedtia ...	22
globosum, Cosmarium ...	87
Glœocapsa, Genus	155
Glœochæte, Genus	151
Glœothece, Genus	152
Glœotila, Genus	21
Glœotrichia, Genus... ...	138
glomerata, Cladophora ...	31
—— Draparnaudia ...	23
Gomphonema, Genus ...	183
Gomphonemeæ, Family ...	183
Gomphosphæria, Genus ...	155
Gonatozygon, Genus ...	39
Gonium, Genus	114
gotlandicum, Cosmarium ...	91
gracile, Closterium	54
—— Encyonema... ...	163
—— Gomphonema ...	185
—— Pediastrum	117
—— Periplegmatium ...	25
—— Selenastrum ...	123
—— Staurastrum ...	105
gracilis, Cylindrotheca ...	216
—— Endoderma... ...	25
—— Entocladia	25
—— Eunotia ... 193	195
—— Navicula	170
—— Nitzschia	216
—— Spirogyra	36
—— Stauroneis	164
—— Tryblionella ...	211
gracillima, Clonothrix ...	148
—— Mougeotia ...	33
—— Navicula ...	174
granatum, Cosmarium ...	78
grande, Cosmarium... ...	76
—— Diatoma	203
—— Mesotænium ...	42
Grantii, Cosmarium... ...	89
granulata, Epithemia ...	190
—— Melosira	217
—— Navicula	175
granulatum, Botrydium ...	113
—— Cosmarium ...	72
—— Pediastrum ...	116
—— Pleurotænium ...	58
—— Sphærozosma ...	110
granulatus, Tetmemorus ...	59
granulosum, Cosmarium ...	84
Gregorii, Cosmarium ...	77
Grevilleana, Spirogyra ...	36
Grevillei, Aphanocapsa ...	156
—— Didymoprium ...	110
Griffithii, Closterium ...	121
Gymnozyga, Genus	111
hæmatites, Rivularia ...	137
Hæmatococcus, Genus ...	114
hamata, Synedra	199
—— Vaucheria	112
Hammeri, Cosmarium ...	74
Hantzschia, Genus	210
Hapalosiphon, Genus ...	138
Harrisonii, Fragilaria ...	201
Hassallii, Spirogyra... ...	36
Heimerlianum, Staurastrum ...	105
Heimerlii, Cosmarium ...	91
helvetica, Cymbella... ...	162
helveticus, Chroococcus ...	157
hemiptera, Navicula ...	166
Heppii, Diplocolon	140
Hermannii, Chantransia ...	13
Herposteiron, Genus ...	22
Heterocysteæ, Sub-Order ...	137
heteromorphum, Characium ...	126
hexacerum, Staurastrum ...	104
hexagonum, Staurastrum 103	108
hexagonus, Arthrodesmus ...	68
hexalobum, Cosmarium ...	85
hexastichum, Cosmarium ...	70
hians, Euastrum	64
—— Hyalotheca	111
Hibernica, Cymatopleura ...	206
Hibernicum, Closterium ...	55
Hibernicus, Campylodiscus ...	210
—— Hapalosiphon ...	138
hiemale, Diatoma	203
hieroglyphicum, Rhizoclonium	30
Hildenbrandtia, Genus ...	13
Hildenbrandtiaceæ, Family ...	13
Hilseana, Navicula	167
hirta, Trochiscia	136
Holmiense, Cosmarium ...	80
homalodermum, Cosmarium ...	74
Homocysteæ, Sub-Order ..	143
Hookerianus, Urococcus ...	134
Hormidium, Genus... ...	18
Hormiscia, Genus	19
Hormospora, Genus... ...	21
Hormogoneæ, Order ...	137
humerosum, Euastrum ...	61
humicolum, Chlorococcum ...	136
humifusum, Nostoc	141
humile, Cosmarium... ...	77
humilis, Navicula	173
Hungarica, Achnanthes ...	189
Hutchinsonii, Pleurotænium ...	59
hyalina, Amphora	159
—— Merismopedia ...	154
—— Palmella	129
hyalinum, Nostoc	141

	page
Hyalotheca, Genus... ...	111
Hydrodictyon, Genus ...	115
Hydrogastraceæ, Family ...	113
Hydruraceæ, Family ...	13
Hydrurus, Genus	13
Hyndmanni, Epithemia ...	192
Hystrix, Scenedesmus ...	121
impressulum, Cosmarium ...	92
incavatum, Euastrum ...	65
incisa, Eunotia	194
inconspicuum, Cosmarium ...	74
—— Penium ...	48
incrustans, Sphærogonium ...	151
incurvum, Closterium ...	50
Incus, Arthrodesmus ...	109
Ineffigiata, Genus	130
inflata, Denticula	204
—— Navicula	173
—— Spirogyra	35
inflexum, Staurastrum ...	105
informe, Stigonema... ...	139
infusionum, Dactylococcus ...	118
—— Glœocystis ...	133
inornatum, Cosmarium ...	89
insigne, Euastrum	62
—— Gomphonema ...	186
—— Zygnema	35
insignis, Spirogyra	36
—— Urococcus	134
insulare, Euastrum	65
integra, Navicula	175
integrum, Cosmarium ...	80
—— Pediastrum ...	117
intermedia, Bulbochæte ...	15
intermedium, Closterium 52	55
—— Cosmarium ...	85
interrupta, Geminella ...	21
—— Pinnularia ...	167
interruptum, Penium ...	45
intestinalis, Enteromorpha ...	17
intricatum, Gomphonema ...	185
intricatus, Hapalosiphon ...	138
inundatum, Phormidium ...	147
Iridis, Navicula	178
irregulare, Staurastrum ...	104
irrigua, Oscillatoria... ...	149
isthmium, Cosmarium ...	86
isthmochondrum, Cosmarium...	72
Itzigsohnii, Œdogonium ...	15
janthina, Amphithrix ...	137
Jenneri, Arthrospira ...	151
—— Closterium... ...	49
—— Euastrum	62
juncidum, Closterium ...	56
Jurgensii, Melosira	218
—— Spirogyra... ...	37

	page
keratophytum, Batrachospermum	12
Kinahani, Gonatozygon ...	39
Kirchneri, Plectonema ...	139
Kirchneriella, Genus ...	133
Kjellmanii, Cosmarium ...	76
—— Staurastrum ...	102
Klebsii, Cosmarium... ...	74
kochianum, Rhizoclonium ...	30
Kützingiana, Cyclotella ...	218
Kützingianum, Cœlosphærium	155
—— Microthamnion	29
Kützingii, Closterium ...	57
labiatum, Pleurotænium ...	59
lacustre, Colletonema ...	180
—— Pleurosigma ...	182
—— Tetragonium ...	220
lacustris, Coscinodiscus ...	219
—— Hæmatococcus ...	114
—— Tetracyclus ...	205
læve, Cosmarium	94
—— Gonatozygon	39
—— Staurastrum	104
lævis, Cymbella	162
—— Tetmemorus	60
lævissima, Navicula... ...	179
Lagerheimii, Lyngbya ...	145
lamellosum, Penium ...	44
laminosum, Phormidium ...	147
lanata, Tolypothrix	140
lanceolata, Achnanthes ...	188
—— Cymbella ...	160
—— Navicula ...	173
—— Nitzschia ...	215
—— Synedra... ...	196
lanceolatum, Closterium ...	52
—— Gomphonema ...	186
Landsboroughii, Œdogonium...	16
lardacea, Schizothrix ...	143
lata, Navicula	166
latissima, Navicula	175
latiuscula, Navicula... ...	177
latum, Cosmarium	88
laxa, Anabæna	142
Legumen, Navicula... ...	169
—— Stauroneis ...	165
Leibleinii, Closterium ...	50
—— Schizomeris ...	18
leiospermum, Zygnema ...	35
Lemanea, Genus	13
Lemaneaceæ, Family ...	13
Lemnæ, Chlorochytrium ...	127
lepida, Navicula	175
lepidum, Cosmarium ...	89
Leptosira, Genus	29
leptosperma, Sphærozyga ...	142
leptotricha, Oscillaria ...	150

	page
Lewisii, Penium	44
Libellula, Penium	45
limosa, Navicula	177
—— Oscillatoria	149
linea, Closterium	57
linearis, Achnanthes ...	188
—— Glœothece	152
—— Nitzschia	214
—— Scenedesmus ...	120
—— Stauroneis	164
—— Surirella	207
lineatum, Closterium ...	55
littorale, Closterium ...	53
lobulatum, Euastrum ...	63
—— Tetraëdron ...	124
Logiense, Cosmarium ...	71
longata, Spirogyra ...	36 37
longipes, Characium	119 125
—— Staurastrum ...	106
longispina, Cerasterias ...	125
longissima, Closteriopsis ...	122
—— Nitzschia ...	216
—— Synedra... ...	198
lubrica, Tetraspora	128
lunaris, Eunotia	195
lunatum, Nephrocytium ...	131
—— Staurastrum ...	97
Lundellii, Cosmarium	81 82
Lunula, Closterium	52
luridum, Phormidium ...	146
Lyngbya, Genus	144
Lyngbyeæ, Family	144
Lyngbyoideæ, Sub-Family ...	144
macrandrum, Œdogonium ...	16
macrococcum, Mesotænium ...	41
macrococcus, Chroococcus ...	134
macrospermum, Cylindrospermum	143
macrosporum, Nostoc ...	141
maculata, Cymbella... ...	161
maculosa, Navicula	175
major, Chroococcus	158
—— Closterium ...	53 54
—— Cosmarium	91
—— Cylindrocystis ...	44
—— Eunotia	192
—— Lyngbya	145
—— Navicula	165
—— Oocystis	131
—— Penium	47
—— Spirulina	151
—— Synechococcus ...	153
majus, Cylindrospermum ...	143
—— Himantidium ..	192
—— Ophiocytium... ...	28
Malinvernianum, Closterium ...	51
—— Cosmarium ...	74

	page
mamillosum, Stigonema ...	139
margaritaceum, Penium ...	46
—— Staurastrum ...	108
margaritiferum, Cosmarium ...	71
marginata, Polycystis ...	155
marina, Synedra	197
Martensiana, Lyngbya ..	144
Mastogloia, Genus	163
maximum, Staurastrum ...	97
media, Nitzschia	213
mediciana, Leptosira ...	29
mediolæve, Cosmarium ...	83
megacanthum, Staurastrum ...	96
Melosira, Genus	216
Melosireæ, Family	216
Meneghiniana, Cyclotella ...	218
Meneghinii, Cosmarium 81 92	93
menisculus, Navicula ...	170
Meriani, Staurastrum ...	103
Meridion, Genus	201
Meridionidæ, Family ...	201
Merismopedia, Genus ...	154
Mesocarpeæ, Sub-Family ...	31
mesodon, Diatoma	203
mesolepta, Fragilaria ...	200
—— Navicula ...	169
Mesotænium, Genus ...	41
Micrasterias, Genus... ...	65
microcephala, Achnanthes ...	188
Microchæte, Genus... ...	139
micrococcum, Mesotænium ...	41
microporum, Cœlastrum ...	115
microscopica, Aphanothece ...	152
microscopicum, Nostoc ...	141
microsphinctum, Cosmarium ...	70
Microspora, Genus	26
Microthamnion, Genus ...	29
minimum, Cosmarium ...	91
—— Tetraëdron ...	124
minor, Aphanochæte ...	22
—— Chroococcus ...	157
—— Conferva	25
—— Cosmarium 69 81 88	92
—— Cylindrocapsa ...	17
—— Euastrum	64
—— Eunotia	192
—— Nitzschia	214
—— Tetmemorus ...	60
minus, Chætospheridium ...	22
—— Mesotænium... ...	41
minuta, Spirotænia	40
—— Surirella	208
minutissima, Amphora ...	159
—— Nitzschia ...	213
—— Synedra ...	196
minutissimum, Cosmarium 73	91

	page
minutissimum, Penium ...	46
minutula, Cyclotella ...	218
—— Navicula ...	175
minutum, Characium ...	125
—— Cosmarium ...	73
—— Gonatozygon ...	39
—— Penium	48
—— Stigonema ...	138
minutus, Tetmemorus ...	60
mirabile, Plectonema ...	144
—— Scytonema ...	139
mirabilis, Mougeotia ...	31
mirificum, Mesotænium ...	41
Mischococcus, Genus ...	118
moniliferum, Closterium ...	50
moniliforme, Batrachospermum	12
moniliformis, Gymnozyga ...	111
—— Hormiscia ...	20
molle, Phormidium	146
moniliforme, Cosmarium ...	86
monodon, Eunotia	194
monomazum, Cosmarium ...	69
montana, Dactylococcopsis ...	153
—— Roya	48
montanum, Cosmarium ...	89
—— Gomphonema ...	184
monticulosum, Staurastrum ...	98
Mooreanum, Penium ...	46
morum, Pandorina	114
Mougeotia, Genus	31
mucosa, Hyalotheca... ..	111
—— Palmella	129
mucronata, Micrasterias ...	65
mucronatum, Staurastrum ...	96
Mülleri, Schizothrix... ...	143
multifilis, Chlamydomonas ...	114
murale, Hormidium ...	18
—— Schizogonium .	18
muralis, Symploca	144
muricatum, Staurastrum 102,	103
muscicola, Tolypothrix ...	140
—— Spirotænia ...	40
muscorum, Nostoc	141
mutabilis, Fragilaria ...	201
mutica, Navicula	175
Myochrous, Scytonema ...	139
Myxophyceæ, Class... ...	137
Nägelii, Nephrocytium ...	131
nana, Navicula	173
—— Nitzschia	214
nanum, Staurastrum... ...	105
—— Stigeoclonium ...	24
nasutum, Cosmarium ...	86
natans, Glœotrichia... ...	138
Navicula, Genus	165
—— Penium	45
Naviculeæ, Family	163
naviculiformis, Cymbella ...	159
neglecta, Ineffigiata... ...	130
neglectum, Navicula ...	170
Nephrocytium, Genus ...	130
nidulans, Aphanothece ...	152
nimbatus, Pleurococcus ...	136
nitida, Spirogyra	38
nitidulum, Cosmarium ...	78
Nitzschia, Genus	210
Nitzschieæ, Family	210
nivale, Rhaphidonema ...	21
nivalis, Melosira	217
nobilis, Navicula	165
—— Surirella	207
nodulosum, Œdogonium ...	15
—— Pleurotænium ...	59
Nordstedtia, Genus... ...	22
Nordstedtianum, Onychonema	110
Nordstedtii, Cosmarium ...	69
—— Œdogonium ...	16
—— Staurastrum ...	98
Normanii, Amphora ...	159
Nostoc, Genus	141
Nostoceæ, Family	141
Nostochinearum, Glaucocystis	154
notabile, Cosmarium ...	81
—— Euastrum	63
notata, Micrasterias... ...	67
Novæ-Semliæ, Cosmarium ..	89
nummuloides, Melosira ...	216
—— Mougeotia ...	32
Nuttallii, Cosmarium ...	81
Nymannianum, Cosmarium ...	78
obcuneatum, Cosmarium ...	95
obesa, Kirchneriella ...	133
obesum, Euastrum	62
obliquum, Cosmarium ...	91
obliquus, Scenedesmus ...	119
oblonga, Navicula	169
oblongum, Euastrum ...	61
—— Penium	45
obscura, Spirotænia... ...	41
obtusa, Denticula	212
—— Nitzschia	214
—— Roya	48
—— Synedra	198
obtusatum, Cosmarium ...	83
obtusilobum, Staurastrum ...	101
obtusum, Penium	47
obtusus, Scenedesmus ...	119
ocellatum, Stigonema ...	138
ochracea, Lyngbya	145
ochthodes, Cosmarium 83,	84
octaëdricum, Tetraëdron ...	124
octangulare, Cosmarium ...	93

	page
octocornis, Arthrodesmus ...	109
Œdogoniaceæ, Family ...	15
Œdogonium, Genus ...	15
Okeni, Oscillatoria	150
oligacanthum, Staurastrum ...	98
olivaceum, Gomphonema ...	186
O'Mearii, Staurastrum ...	97
Onychonema, Genus ...	109
Oocardium, Genus	130
Oocystis, Genus	131
opalinum, Nostoc	141
operculata, Cyclotella ...	218
Ophiocytium, Genus ...	27
orbicularis, Coleochæte ...	14
orbiculatum, Cosmarium ...	86
ordinarium, Zygnema ...	34
ordinata, Hormospora ...	21
ordinatum, Cosmarium ...	87
orichalcea, Melosira ...	217
ornatum, Cosmarium ...	71
—— Staurastrum ...	106
ornithocephalum, Characium ...	125
orthonotum, Closterium ...	55
orthostichum, Cosmarium ...	72
Oscillarioideæ, Sub-Family ...	146
oscillarioides, Anabæna ...	142
—— Spirulina ...	151
Oscillatoria, Genus	149
oscitans, Micrasterias ...	65
ovale, Cosmarium	82
ovalis, Amphora	158
—— Navicula ... 174	175
—— Surirella	208
ovata, Surirella	208
oviforme, Dictyosphærium ...	130
oxyacanthum, Staurastrum ...	106
oxyrhyncus, Synedra ...	198
pachyderma, Microspora ...	27
pachydermum, Cosmarium ...	69
Palangula, Cosmarium ...	94
Palea, Nitzschia	215
pallidus, Chroococcus ...	158
Palmella, Genus	129
Palmellaceæ, Family ...	115
Palmodactylon, Genus ...	128
paludosa, Amphiprora ...	183
Pandorina, Genus	114
panduriforme, Cosmarium ...	86
panduriformis, Oocystis ...	132
—— Surirella ...	209
panniforme, Stigonema ...	139
papillifera, Micrasterias ...	66
papillosum, Spondylosium ...	95
papyrinum, Phormidium ...	147
paradoxa, Nitzschia... ...	212
paradoxum, Staurastrum ...	106
parasiticum, Odontidium ...	201
parietina, Calothrix... ...	137
parietinum, Hormidium ...	19
parva, Cymbella	161
—— Spirogyra	36
parvula, Mougeotia	32
—— Nitzschia	211
parvulum, Closterium ...	49
—— Cosmarium ...	95
—— Gomphonema ...	186
—— Ophiocytium ...	28
—— Zygnema ...	34
pectinalis, Eunotia	193
pectinatum, Euastrum ...	65
—— Zygnema ...	34
pectorale, Gonium... ...	114
Pediastrum, Genus	116
Pediculus, Amphora ...	159
—— Cocconeis ...	189
pellucida, Amphipleura ...	181
—— Spirogyra... ...	37
penicillatus, Hydrurus ...	13
Penium, Genus	44
pentagonum, Polyedrium ...	124
peracerosum, Closterium ...	53
peregrina, Navicula... ...	170
pericymatium, Cosmarium ..	87
perpusilla, Cocconeis ...	190
pertusum, Pediastrum ...	116
Phaseolus, Cosmarium ...	70
Phœnicenteron, Stauroneis ...	163
Phormidium, Genus ...	146
pileolatum, Staurastrum ...	107
pilosissima, Aphanochæte ...	14
pilosum, Gonatozygon ...	39
—— Staurastrum ...	99
Pinacidium, Polyedrium ...	124
pinnata, Surirella	209
piscinale, Nostoc	141
pisiformis, Chætophora ...	23
pisum, Glœotrichia	138
Placentula, Cocconeis ...	189
plana, Nitzschia	211
platygynum, Œdogonium ...	15
Plectonema, Genus	144
Pleurococcus, Genus ...	135
pleurocarpus, Mesocarpus ...	31
Pleurosigma, Genus... ...	181
Pleurotænium, Genus ...	58
plicatum, Cosmarium ...	90
plumosa, Draparnaudia ...	23
pluvialis, Chlamydococcus ...	114
—— Stephanosphæra ...	114
Pokornyanum, Cosmarium ...	79
polare, Euastrum	79
polonicum, Cosmarium ...	89

	page
Polycystis, Genus	155
polydermatica, Glœocapsa ...	156
polygonum, Xanthidium ...	67
polymazum, Cosmarium ...	70
polymorphum, Penium ...	46
—— Rhaphidium 121	122
—— Staurastrum ...	105
polytricha, Aphanochæte ...	14
polytrichum, Staurastrum ...	99
Porphyridium, Genus ...	156
Portianum, Cosmarium ...	72
porticalis, Spirogyra ...	37
prælongum, Closterium ...	54
præmorsum, Cosmarium ...	75
prærupta, Eunotia	194
Prasiola, Genus	18
princeps, Œdogonium ...	17
—— Oscillatoria ...	149
Pringsheimii, Chætospheridium	22
—— Œdogonium ...	16
—— Staurastrum ...	99
Pritchardianum, Closterium ...	56
proboscidea, Epithemia ...	192
proboscideum, Staurastrum ...	107
producta, Navicula	179
productum, Staurastrum ...	108
pronum, Closterium ...	56
prostratum, Encyonema ...	162
protensum, Stigeoclonium ...	24
Protococcaceæ, Sub-Family ...	134
Protococcoideæ, Order ...	113
Protococcus, Genus... ...	136
Protoderma, Genus... ...	25
protogenita, Glœotila ...	21
protogenitus, Protococcus ...	136
pruniforme, Nostoc	142
pseudamœnum, Cosmarium ...	89
pseudarctoum, Cosmarium ...	87
Pseudoclosterium, Roya ...	48
Pseudocœnobieæ, Sub-Family	118
pseudoconnatum, Cosmarium...	87
Pseudodianæ, Closterium ...	49
pseudoexiguum, Cosmarium ...	91
pseudofurcigerum, Staurastrum	98
pseudonitidulum, Cosmarium	78
pseudopyramidatum, Cosmarium	78
Pseudoraphidieæ, Order ...	190
Pseudoregnesii, Cosmarium ...	89
Pseudosebaldi, Staurastrum ...	106
pseudotetracerum, Staurastrum	104
pulchella, Draparnaudia ..	24
—— Synedra	196
pulchellum, Dictyosphærium ...	130
—— Euastrum ...	63
—— Spondylosium ...	95
pulchrum, Cœlastrum ...	115
Pulvisculus, Chlamydomonas...	114
pumilum, Cosmarium ...	95
punctata, Cyclotella... ...	219
—— Merismopedia ...	154
—— Nitzschia	210
—— Orthosira	217
punctato-striatum, Œdogonium	16
punctatum, Penium... ...	46
—— Staurastrum ...	96
punctulatum, Cosmarium ...	76
—— Staurastrum ...	101
Pupula, Navicula	179
purpurascens, Phormidium ..	146
purpureum, Mesotænium ...	42
pusilla, Navicula	175
pusillum, Closterium ...	54
pyramidatum, Cosmarium ...	78
—— Spondylosium...	95
—— Staurastrum ...	103
pygmæa, Chantransia ...	13
—— Kirchneriella ...	133
—— Navicula	175
—— Pinnularia	173
—— Tolypothrix ...	140
pygmæum, Cosmarium ...	92
—— Spondylosium ...	95
—— Staurastrum ...	102
quadrangulata, Mougeotia ...	33
quadrata, Crucigenia ...	118
quadratum, Cosmarium ...	90
—— Staurospermum ...	33
quadricauda, Scenedesmus 119	120
quadrifarium, Cosmarium ...	70
quadrum, Cosmarium ...	88
quaternarium, Cosmarium ..	75
quinarium, Cosmarium ...	76
quinina, Spirogyra	37
Rabenhorstii, Navicula ...	167
racemosa, Vaucheria ...	112
Raciborskii, Conferva ...	26
radians, Chodatella	123
—— Synedra ... 197	199
radicans, Ulothrix	18
radiatus, Coscinodiscus ...	219
radiosa, Navicula	171
Ralfsiana, Glœocapsa ...	156
Ralfsii, Arthrodesmus ...	109
—— Closterium	57
—— Cosmarium... ...	68
—— Gonatozygon ...	39
—— Sphærozyga ...	142
—— Zygnema	34
Raphidieæ, Order	158
recta, Micrasterias	67
—— Nitzschia	215
rectangulare, Cosmarium ...	91

	page
rectangularis, Bulbochæte ...	15
—— Crucigenia ...	117
rectosporum, Cosmarium ...	78
recurva, Mougeotia	32
Regnellii, Cosmarium ...	93
Regnesii, Cosmarium ...	89
regulare, Tetraëdron ...	123
regularis, Glæocystis ...	132
regularium, Cosmarium ...	75
Reinhardtii, Navicula ...	173
Reinschiana, Tetrapedia ...	154
Reinschii, Cosmarium ...	92
—— Staurastrum ..	98
reniforme, Cosmarium ...	71
repens, Aphanochæte ...	14
—— Herposteiron ...	22
reticularis, Trochiscia ...	136
reticulatum, Hydrodictyon ...	115
Retzii, Phormidium... ...	147
reversa, Nitzschia	216
Rhaphidieæ, Sub-Family ...	118
rhaphidioides, Cerasterias ...	125
—— Dactylococcus...	118
Rhaphidium, Genus ..	121
Rhaphidonema, Genus ...	21
Rhizoclonium, Genus ...	30
Rhoicosphenia, Genus ...	187
rhomboides, Vanheurckia ...	180
rhynchocephala, Navicula ...	172
Richterianum, Chroothece ...	152
rivulare, Œdogonium ...	16
Rivularia, Genus	137
Rivulariaceæ, Family ...	137
rivulariarum, Lyngbya ...	146
rivularis, Aphanocapsa ...	156
—— Hildenbrandtia ...	13
—— Hormiscia... ...	20
—— Zonatrichia ...	137
robusta, Eunotia	194
—— Surirella	207
robustum, Closterium ...	50
Roesiana, Melosira	217
rosea, Hildenbrandtia ...	13
roseo-persicinus, Clathrocystis	155
Rostafinskii, Cosmarium ...	84
rostratum, Closterium ...	57
—— Euastrum ...	62
rotata, Micrasterias	66
Rothii, Œdogonium ..	15
rotundatum, Cosmarium ...	88
Rotula, Cyclotella	218
—— Pediastrum	117
rotundum, Staurastrum ...	102
Roya, Genus	48
rufescens, Chroococcus ...	158
—— Penium	44
rufescens, Pleurococcus ...	135
rufopellitum, Penium ...	44
rupestre, Nostoc	141
—— Phormidium ...	147
rupestris, Epithemia ...	192
—— Glæocystis ...	133
—— Lyngbya	147
—— Tetracyclus ...	205
salina, Stauroneis	164
—— Surirella	208
—— Synedra	197
sanguineus, Pleurococcus ...	135
saxicola, Aphanothece ...	152
saxonica, Vanheurckia ...	180
Saxonicum, Staurastrum ...	99
scabrum, Staurastrum ...	107
scalaris, Mougeotia	32
scalpelliformis, Nitzschia ...	214
scalproides, Pleurosigma ...	183
scalprum, Pleurosigma ...	182
Scenedesmus, Genus ...	119
—— Cosmarium ...	73
Schizochlamys, Genus ...	127
schizodermaticus, Chroococcus	158
Schizogonium, Genus ...	18
Schizomeris, Genus... ...	18
schizonemoides, Navicula ...	170
Schizothrix, Genus	143
Schliephackianum, Cosmarium	74
Sciadium, Genus	27
scita, Navicula	175
Scoliopleura, Genus... ...	181
scorpioideum, Staurastrum ...	106
Scotica, Encyonema ...	163
sculpta, Navicula	176
sculptum, Closterium ...	55
scutata, Coleochæte... ...	14
Scutellum, Tryblionella ...	212
Scytonema, Genus	139
Scytonemaceæ, Family ...	139
Sebaldi, Staurastrum ...	106
secedens, Spondylosium ...	95
Selenastrum, Genus... ...	123
Semen, Navicula	174
semicirculare, Staurastrum ...	104
septentrionale, Cosmarium ...	94
serians, Navicula	176
sericea, Vaucheria	112
serpentaria, Choaspis ...	38
sessilis, Vaucheria	112
setaceum, Closterium ...	57
setigera, Bulbochæte ...	15
setigerum, Rhaphidium ...	122
sexcostatum, Staurastrum ...	108
Sieboldi, Characium ...	125
Sigma, Nitzschia	213

	page
Sigmoidea, Nitzschia ...	213
sigmoideum, Closterium ...	53
—— Rhaphidium ...	122
silesiaca, Navicula	171
simplex, Cosmarium ...	85
—— Palmodactylon ...	128
simplicissima, Oscillatoria ...	150
sinuata, Nitzschia	212
sinuosum, Cosmarium ...	90
—— Euastrum... ..	61
Siphoneæ, Order	112
Sirosiphoniaceæ, Family ...	138
Smithii, Eunotia	195
—— Mastogloia ...	163
—— Navicula	174
—— Nitzschia	216
—— Stauroneis ...	165
—— Synedra	196
—— Xanthidium ...	68
Solea, Cymatopleura ...	206
Soleirolei, Himantidium ...	194
solidum, Cosmarium ...	72
solitaria, Oocystis	131
soluta, Coleochæte	14
Sorastrum, Genus	116
Sorex, Epithemia	190
speciosa, Hormiscia... ...	21
speciosissimum, Cosmarium ...	85
speciosum, Cosmarium 84	85
spectabilis, Nitzschia ...	216
Spencerii, Pleurosigma ...	182
spetsbergensis, Cosmarium ...	74
sphærica, Aphanothece ...	152
sphæricum, Cœlastrum ...	115
—— Nostoc	142
Sphærogonium, Genus ...	151
sphæroideum, Cosmarium ...	73
sphærophora, Navicula ...	176
Sphærozosma, Genus ...	110
Sphagnicolum, Cosmarium ...	91
sphalerostichum, Cosmarium ...	72
spicatus, Scenedesmus ...	120
spinosa, Orthosira ...	217
spinospermum, Penium ...	45
spinosum, Staurastrum ...	98
spinulosum, Sorastrum ...	116
spirale, Rhaphidium ...	122
spiralis, Surirella	209
Spirogyra, Genus	35
spirostriolatum, Penium ...	46
Spirotænia, Genus	39
Spirulina, Genus	151
Spirulinoideæ, Sub-Family ...	151
splendens, Synedra	197
splendida, Oscillatoria ...	150
—— Surirella... ...	207
Spondylosium, Genus ...	95
spongiosum, Staurastrum ...	103
Sportella, Cosmarium ...	75
stagnale, Batrachospermum ...	12
—— Cylindrospermum ...	143
—— Zygnema	34
Staurastrum, Genus	96
staurogeniæformis, Cohniella...	118
stauroneiformis, Pinnularia ...	167
Stauroneis, Genus	163
stellinum, Zygnema... ...	34
Stephanosphæra, Genus ...	114
Stichococcus, Genus ...	134
stictica, Choaspis	38
Stigeoclonium, Genus ...	24
Stigonema, Genus	138
Stipitococcus, Genus ...	127
strangulatum, Cosmarium ...	87
stratum, Oocardium ...	130
striatula, Surirella	208
striatum, Cosmarium ..	77
strictissimum, Microthamnion	29
striolatum, Closterium ..	55
subæqualis, Cymbella ...	160
—— Synedra... ...	198
subarcuatum, Staurastrum ...	98
subcirculare, Cosmarium ...	84
subcostatum, Cosmarium ...	78
subcrenatum, Cosmarium ...	70
subcruciatum, Staurastrum ...	97
Subcucumis, Cosmarium ...	69
subelobatum, Euastrum ...	64
subexcavatum, Cosmarium ...	86
subflexilis, Melosira ...	218
subfusca, Oscillaria	148
subgranatum, Cosmarium ...	79
sublæve, Cosmarium ...	93
sublobatum, Cosmarium ...	90
submarina, Vaucheria ...	112
subnotabile, Cosmarium ...	84
subochthodes, Cosmarium ...	80
suborbiculare, Staurastrum ...	101
subpolymorphum, Penium ...	47
subpronum, Closterium ...	56
subprotumidum, Cosmarium ...	77
subpunctulatum, Cosmarium ...	76
subquadratum, Cosmarium ...	90
subramosum, Palmodactylon ...	128
subramosus, Dactylococcus ...	119
Subreinschii, Cosmarium . .	81
subreniforme, Cosmarium ...	220
subsalsa, Spirulina	151
subsetaceum, Œdogonium ...	17
subspeciosum, Cosmarium ...	85
substriatum, Cosmarium ...	77
subtholiforme, Cosmarium 74,	75